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Water Resource Report 44

1978

GEOLOGY AND GROUNDWATER RESOURCES OF NORTHERN BERKS COUNTY, PENNSYLVANIA

Charles R. Wood
David B. MacLachlan

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY
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Water Resource Report 44

GEOLOGY AND GROUNDWATER RESOURCES OF NORTHERN BERKS COUNTY, PENNSYLVANIA

by Charles R. Wood
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Prepared by the United States Geological Survey, Water Resources Division, in cooperation with the Pennsylvania Geological Survey

PENNSYLVANIA GEOLOGICAL SURVEY
FOURTH SERIES
HARRISBURG

1978

ADDITIONAL COPIES
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PREFACE

Northern Berks County is an area of diverse and complex geology upon which there has been a significant urban and suburban expansion. The population growth, as well as industrial development in the area, have increased the demand for water supplies to such a degree that development and utilization of the subsurface water resources is a necessity in order to cope with present and future water needs.

This report presents a comprehensive description and inventory of the geology and groundwater resources of Northern Berks County with the hope that all planners, users, and developers may benefit from the data offered. Groundwater is an important natural resource of the area, and a proper understanding of its occurrence, availability, and quality can lead to efficient development and sound management of this invaluable resource.

ARTHUR A. SOCOLOW

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GEOLOGY AND GROUNDWATER RESOURCES OF NORTHERN BERKS COUNTY, PENNSYLVANIA

by
Charles R. Wood and David B. MacLachlan

ABSTRACT

The area of investigation comprises approximately 540 square miles and lies entirely within the Great Valley section of the Valley and Ridge physiographic province. The Great Valley is underlain chiefly by carbonate rocks in the south and by shale and graywacke in the north. Most of the carbonate rocks are included in two great nappes that differ appreciably in stratigraphic detail.

The principal noncarbonate rocks in northern Berks County are the Middle and Upper Ordovician Martinsburg Formation and the Lower and Middle Ordovician rocks of the Hamburg sequence. Both units consist chiefly of shale and graywacke, but the Hamburg sequence also contains red and green shales, chert, and several types of limestones and dolomites. The Hamburg sequence probably consists of several thrust or gravity-slide slices that were stacked in their present order and later thrust on top of the Martinsburg Formation as one large, structurally complex sheet.

Groundwater is almost entirely confined to secondary openings that occur along bedding planes and joints, faults, and other fractures. The number of water-bearing zones penetrated in the first 300 feet of the noncarbonate rocks is greater than in the same interval in the carbonate rocks, although the yields of the individual zones are, on the average, much greater in the carbonate rocks. The number of zones penetrated in the noncarbonate rocks decreases with depth, and relatively few zones are encountered below 300 feet. Therefore, drilling more than 300 feet or perhaps 400 feet below land surface will only rarely produce significant increases in the yields of wells. The number of zones penetrated in the carbonate rocks also decreases with depth, but not as significantly as in the noncarbonate rocks. Significant quantities of water have been obtained from zones in carbonate rocks as deep as 600 feet below the land surface.

Yields of 1,000 gpm (gallons per minute) or more are possible in the better carbonate-rock aquifers. However, nondomestic wells in some of the poorer carbonate-rock aquifers have median yields of less than 60 gpm. Median yields of nondomestic wells in the noncarbonate-rock aquifers range from 11 to 140 gpm.

Median specific capacities of nondomestic wells exceed 10 gpm/ft (gallons per minute per foot) in four of ten carbonate-rock aquifers. Median specific capacities of nondomestic wells are less than 1.0 gpm/ft in two of ten carbonate-rock aquifers. The highest median specific capacities are

obtained from wells in valleys, and the lowest are obtained from wells on hilltops.

A water-level contour map based on water levels measured in April 1972 was prepared for that part of northern Berks County underlain by carbonate rocks. Areas of low water-level slope on the map generally coincide with areas of high transmissivity, and areas of high water-level slope coincide with areas of low transmissivity.

In the noncarbonate rocks, high-capacity (about 50 gpm or more) wells located less than 1,500 feet apart are subject to significant mutual interference. In the carbonate rocks, high-capacity wells may be located as little as 100 feet apart without causing excessive interference in areas of high transmissivity. High-capacity wells located at least 1,000 feet apart are not subject to excessive interference in areas of moderate to low transmissivity.

Natural annual fluctuations of water levels in wells generally range from 3 to 20 feet. Most of the larger areas showing declines of 10 feet or more are on or near groundwater divides. The drought of 1963-67 caused groundwater levels to be below normal for several successive years. Water levels have risen at least 30 feet in some wells in the northeastern part of the study area since 1967. Tropical Storm Agnes (June 1972) caused higher-than-normal groundwater levels over much of the study area.

Transmissivities were calculated from median specific-capacity data. Several of the aquifers in both the carbonate and noncarbonate rocks have transmissivities less than 200 ft^2/day. Most of the other formations have transmissivities that range from 1,000 to 4,000 ft^2/day. In general, the shale units with the highest transmissivities are those that contain some limestone or dolomite. The carbonate rocks with the lowest transmissivities are those that contain large amounts of clayey material or those that have a significant amount of shale.

Maximum allowable concentrations as defined and recommended by the U. S. Environmental Protection Agency (1975) were exceeded by one or more constituents in water from 27 of 82 wells. These concentrations generally were not greatly exceeded, and only the high nitrate concentrations are a definite hazard to health. Two areas of high fluoride concentration resulted from soluble industrial wastes reaching the water table. Industrial wastes containing chromium polluted the groundwater at Sinking Spring. One area near Sinking Spring was polluted by a gasoline spill in the early 1930's and remains polluted 40 years later. Locally, other wells are polluted by petroleum products. Wells drilled in the Pen Argyl Member of the Martinsburg Formation often encounter water high in hydrogen sulfide at depths of 100 to 150 feet below land surface.

In 1970, public supplies in Berks County pumped 8.2 mgd (million gallons per day) of groundwater, self-supplied industries used 14.5 mgd, air conditioning in commercial buildings used 1.4 mgd, and private supplies for domestic and stock used about 6.0 mgd.

Widely spaced wells in the highly permeable carbonate rocks of the Great Valley (excluding the carbonate rocks of the Hamburg sequence) are capable of a total sustained yield of about 70 mgd. That part of the study area underlain by noncarbonate rocks could yield at least another 80 mgd to wells. As only 20 mgd of groundwater was being used in the study area in 1970, large amounts can be developed in the future.

INTRODUCTION

The study is part of a continuing program to investigate the groundwater resources of Pennsylvania. The investigations are made by the U. S. Geological Survey in cooperation with the Pennsylvania Topographic and Geologic Survey.

Urban expansion and suburban development in the vicinity of the city of Reading has increased the demand for water to supply both industrial and domestic needs. The carbonate rocks that underlie the south part of the study area are the greatest potential source of groundwater in Berks County, whereas the shales in the north part are the principal source of water for the smaller towns north of the city. An evaluation of the availability, occurrence, movement, and quality of groundwater in these rocks is necessary for the efficient development of the resource.

Records of more than 900 wells and springs, including almost all of the public supply and industrial wells in the area, were compiled during the course of this investigation. The well records are given in Table 14 and the spring records in Table 10. Locations of wells and springs are shown on Plate 1. Water-level fluctuations in four wells were recorded. Chemical analyses were made on more than 70 samples from springs and wells. The results are presented in Tables 11 and 12. Geologic mapping of the carbonate rocks in the study area was done by the Pennsylvania Topographic and Geologic Survey.

The stratigraphic nomenclature used in this report is that of the Pennsylvania Topographic and Geologic Survey and does not necessarily follow the usage of the U. S. Geological Survey.

LOCATION AND PHYSIOGRAPHIC SETTING

The area of investigation in northern Berks County comprises approximately 540 square miles. It is bounded on the west by the Lebanon County line, on the north by the Schuylkill County line, on the east by the Lehigh County line, and on the south by physiographic boundaries—either the north edge of the Reading Prong or the north edge of the Triassic Lowland

(Figure 1). The area lies almost entirely within the Great Valley section of the Valley and Ridge physiographic province.

A large part of the study area is drained by the Schuylkill River, mostly by two principal tributaries that join the river near the south edge of the Great Valley. Maiden Creek, which has a drainage area of 216 square miles, enters the Schuylkill from the east 2 miles below Leesport. Tulpehocken Creek, which has a drainage area of 219 square miles, enters the Schuylkill from the west at Reading. The extreme northwest part of the study area is drained by Swatara Creek, and the extreme southeast part by Little Lehigh Creek (Plate 1).

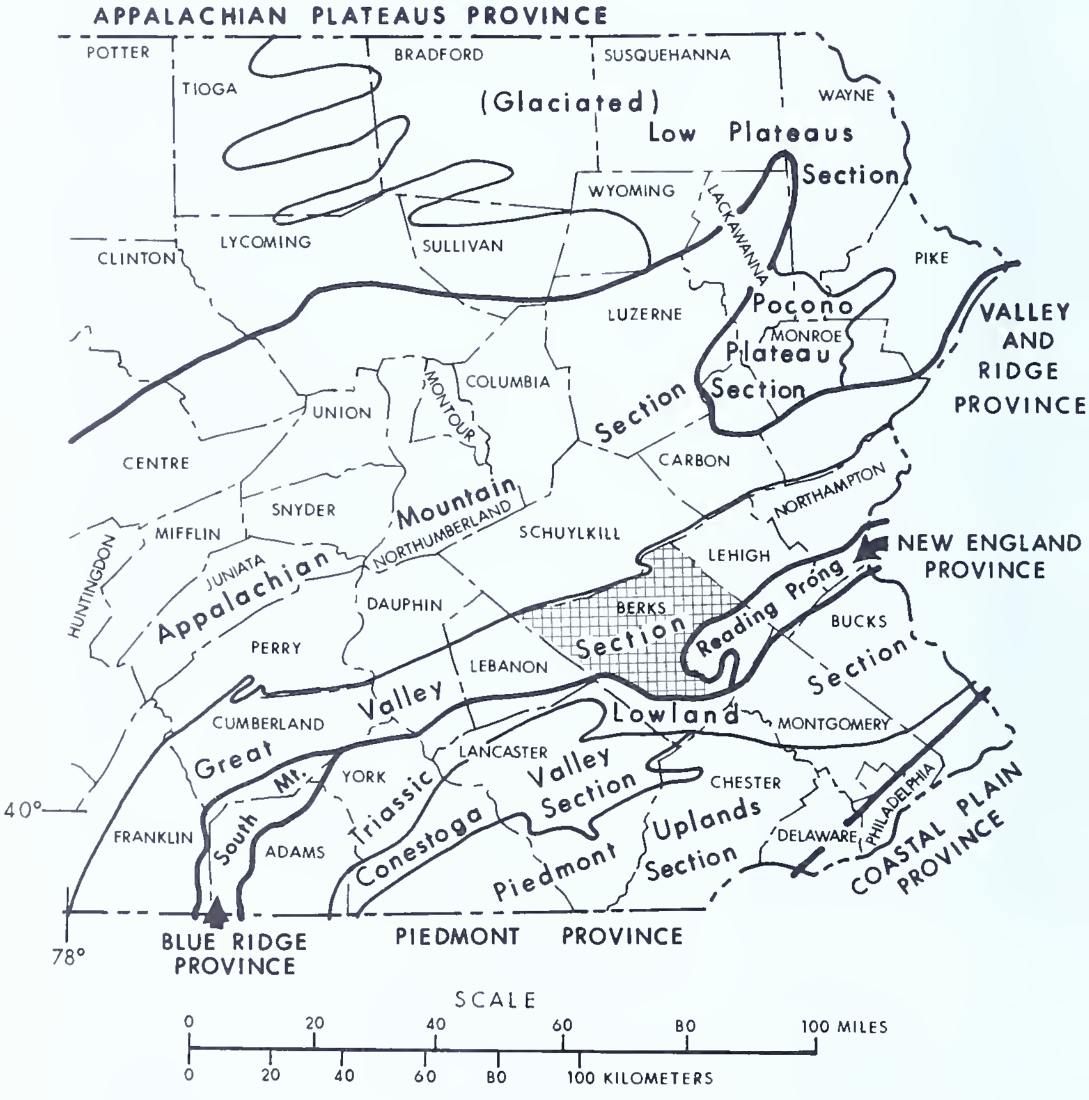

Figure 1. Map of eastern Pennsylvania showing the physiographic provinces and the location of the study area.

WELL-NUMBERING SYSTEM

The well number consists of a county abbreviation (Be for Berks) and a sequence number assigned when the well was first visited. Numbers missing from Table 14 have been assigned to wells in parts of the county that are not included in the study area. The well locations given in Table 14 are the latitude and longitude, in degrees and minutes, of the southeast corner of the 1-minute quadrangle within which the well is located. The well locations are shown on Plate 1.

ACKNOWLEDGEMENTS

The authors are grateful to the many industrial concerns, private water companies, municipal water authorities, and private well owners who supplied information and allowed their wells to be pumped and sampled.

Many well drillers provided groundwater data. The owners and employees of Kohl Bros., Inc., of Myerstown, Pennsylvania deserve special mention for having spent much time assisting the authors.

The authors are indebted to Professors Ina Alterman of Herbert H. Lehman College of the City University of New York, Bronx, New York, and Paul Myers of Lehigh University, Bethlehem, Pennsylvania, who not only provided manuscript maps but also spent several days in the field helping the authors to understand the structure and stratigraphy of the northern part of the Great Valley.

USE OF WATER

In 1970, about 225 mgd of water was used in Berks County. This figure includes all withdrawals from naturally replenished sources and an unknown quantity of reused water. Of this total amount, 74 percent, or 166 mgd, was surface water used for cooling at two steam-electric generating plants. Approximately half of the remaining 58 mgd was obtained from streams and reservoirs, and half was obtained from wells, springs, quarries, and one active mine. This water was used for industrial processes, cooling, air conditioning, public supply, and irrigation, which are discussed separately in the following sections of this report. Where the data are available, the amount of usage within the study area is given in addition to the usage for the entire county.

PUBLIC SUPPLY

Annual pumpage of water from all sources for public supplies in Berks County from 1950 through 1972 is shown graphically in Figure 2. Approximately 94 percent of the 1972 pumpage was by public supplies located partly or entirely within the study area. A small quantity of groundwater (0.36

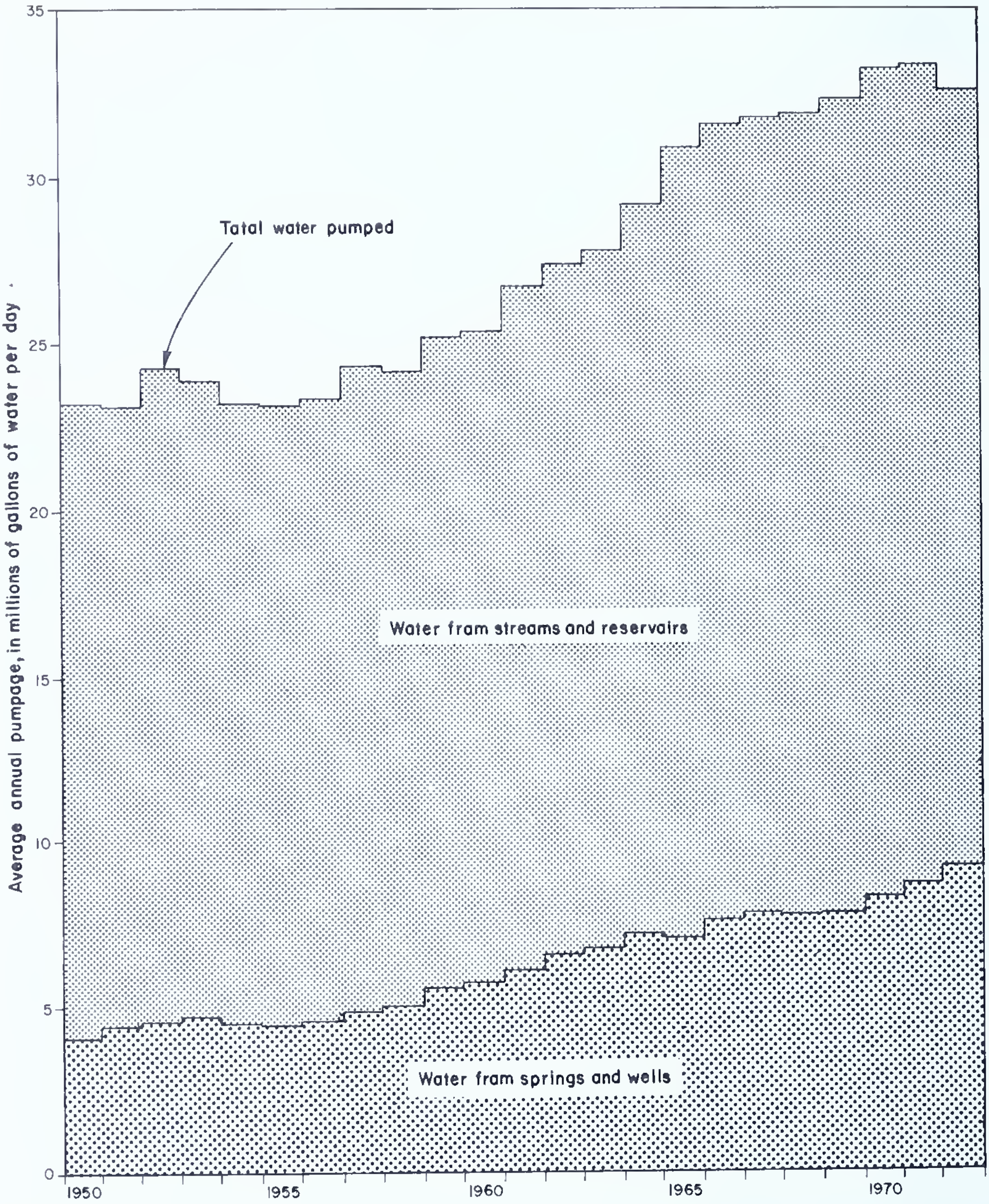

Figure 2. Annual pumpage of water for public supplies in Berks County, 1950-72.

mgd in 1972) obtained within Berks County and transported to Montgomery County for use by the Pennsburg Water Company is included in the data shown in Figure 2. The data presented in this graph include use by consumers, leakage from distribution systems, and water required for fire fighting, street cleaning, and other public uses.

The population of Berks County has been increasing steadily. Population data from the U. S. Department of Commerce, Bureau of the Census, are as follows:

Year	*Population*
1940	241,884
1950	255,740
1960	275,414
1970	296,382

The increase in the use of public water has been somewhat greater than the rate of population growth. Population increased 16 percent from 1950 to 1970, while water use increased 43 percent. This indicates a substantial increase in per capita use, nearly all of which took place after 1960. Long-term (1920-70) changes in per capita use for the area served by the city of Reading are shown in the following table:

Year	*Per capita use (gpd)*
1920	152
1925	156
1930	104
1935	95
1940	103
1945	117
1950	138
1955	134
1960	137
1965	160
1970	195

The decrease in per capita use from 1925 to 1930 resulted from installation of meters (installation was completed in 1926). This decrease was more than offset by increases from 1935 through 1970. Per capita use for all of Berks County is similar to that for Reading, as Reading used no less than two thirds of all the water pumped by public supplies in Berks County in all years prior to 1971.

An inventory of public water facilities in the study area in 1972 is given in Table 1. The data given in the table are based on field visits and the files of the Pennsylvania Department of Environmental Resources and Public Utility Commission. The dependable capacities of the groundwater systems given in the table are based on the historical yield of the systems with their existing pumping equipment.

The average per capita use for all public supplies in Berks County in 1972 was 150 gpd. These figures for per capita use reflect many different uses and are much higher than the per capita use for domestic purposes, which probably averages about 50 gpd for metered or privately owned systems (Delaware River Basin Commission, 1973, p. IV11).

About 216,000 persons, or about 73 percent of the population of Berks County, were served by public supplies in 1972. The remaining 80,000 persons, or 27 percent of the population, were served by individually owned water systems. Mangan and Graham (1953, p. 4) estimated that 3.4 mgd

Table 1. *Municipal and Institutional Water Facilities*

Community or township served / Water company or authority	Other areas served	Source Primary (1), secondary (2): Streams	Wells	Springs	Source and impoundments	Yield from impoundments (mgd) / Dependable capacity of groundwater system (mgd)	Rated plant capacity (mgd) / Average plant output, 1972 (mgd)	Estimated population served, 1972	Number of services, 1972 / Number of metered services, 1972
Bern Township	—	1	—	—	Plum Creek (impoundment)	X	0.20	1,000	8
Berks Institutional District						—	.14		6
Bernville	Part of Penn Township	—	1	—	2 wells (Be-180, 181)	—	—	900	261
Bernville Water Co.						.12	.041		261
Centre Township	—	—	1	—	1 well (Be-553)	—	—	250	80
Mohrsville Water Association						.22	.01		80
Exeter Township	Part of St. Lawrence Borough	—	1	2	6 wells (Be-231, 234, 244, 546, 547, 549) Reserve: 3 wells and 1 spring	—	—	3,750	976
Glen Alsace Water Co.						1.5	.23		976
Exeter Township	—	—	1	2	2 wells and 3 springs (Be-240, 311)	—	—	600	130
H. & P. Koch Water Co.						.10	.029		130
Fleetwood	Part of Ruscombmanor and Richmond Townships	—	2	1	24 springs (impoundment); 5 wells (Be-513, 514, 602,		—	3,270	1,031
						.60	.29		1,027

Hamburg Municipal Authority of Berks County	Part of Windsor Township	1	2	—	4 wells (Be-210-213) Furnace Creek: Impounding dam, 32.4 million gallons. Reservoir, 1.75 million gallons	3.00 1.00	— .42	4,100	1,513 1,513
Heidelberg Township Bethany Home	—	—	—	1	1 spring (Be-Sp-6)	— .03	— .03	220	15 1
Jefferson Township North Heidelberg Water Co.	Part of North Heidelberg Township	—	1	—	1 well (Be-591)	— 0.10	— .001	54	28 19
Kutztown	Part of Maxatawny Township	—	1	—	3 wells (Be-57, 241,397)	— 4.2	— .79	8,000	1,500 1,500
Leesport	—	—	1	—	3 wells (Be-189, 190, 548)	— .36	— .093	1,170	416 416
Lyons Lyons Water Co.	—	—	1	2	2 wells (Be-250, 251) and 2 springs	— .10	— .03	650	160 0
Maidencreek Township Water Authority	—	1	—	2	Peters Spring Run 13 springs (impoundment)	X .17	X .05	1,000	260 0
Maxatawny Township Flint Hill Water Co.	—	—	1	2	2 wells (Be-227, 1207) and 1 spring	— .13	— .02	360	105 0
Mount Penn Municipal Water Authority	Part of Exeter and Lower Alsace Townships, St. Lawrence Borough	3	1	2	6 wells (Be-218, 219, 419, 554, 575, 576) Stream (impoundment) Springs	1.00 2.9	— .91	10,700	3,252 3,252

Table 1. *(Continued)*

Community or township served Water company or authority	Other areas served	Source Primary (1), secondary (2): Streams	Wells	Springs	Source and impoundments	Yield from impoundments (mgd) Dependable capacity of groundwater system (mgd)	Rated plant capacity (mgd) Average plant output, 1972 (mgd)	Estimated population served, 1972	Number of services, 1972 Number of metered services, 1972
Muhlenberg Township Authority	Part of Alsace Township and Laureldale Borough	—	1	2	11 wells (Be-168, 169, 170, 171, 172, 173, 174, 175, 176, 803, 804, 1208) and 2 springs City of Reading	— 4.1	— 3.12 (.52)	13,000	5,287 5,287
Ontelaunee Township	—	—	—	—	City of Reading	— —	— (.066)	450	X X
Reading Bureau of Water	Kenhorst; part of Bern, Cumru, Lower Alsace, Muhlenberg, and Ontelaunee Townships	1	—	—	Maiden Creek: Ontelaunee Lake, 3,880 million gallons; Antietam Lake, 110 million gallons	37.0 —	26.7 20.72	94,030	29,034 29,034
Shillington	Mohnton; part of Cumru and Spring Townships	1	—	—	Kleinginna Creek Wyomissing Creek Reading	1.0 —	.864 .53 (.42)	10,800	5,050 5,050
Shoemakersville	Part of Perry Township	—	1	—	4 wells (Be-214, 216, 217, 550)	— .42	— .067	1,410	562 556

Sinking Spring	Wyomissing Hills; part of Spring Township and West Lawn	—	1	—	9 wells (Be-192, 201, 202, 203, 206, 207, 422, 423, 799)	—	—	18,420	5,086
Citizens Utilities Water Co. of Pennsylvania						3.9	1.71		5,086
South Heidelberg Township	—	1	—	—	Tilt Hammer Creek	X	X	2,300	X
Wernersville State Hospital					Mountain Creek	—	.40		X
Temple	—	—	—	—	City of Reading	—	—	1,670	500
							(.12)		500
Topton	Part of Longswamp Township	—	2	1	31 springs and 3 wells (Be-618, 619, 621)	—	—	1,960	600
						.48	.18		600
Topton	—	—	2	1	Springs and 1 well (Be-527)	—	—	X	X
Topton Lutheran Home						X	.02		X
Wernersville	Part of Lower Heidelberg and South Heidelberg Townships	—	2	1	11 springs and 2 wells (Be-187, 188)	—	—	2,960	817
Municipal Authority						.60	.16		817
West Reading	—	—	—	—	City of Reading	—	—	4,580	1,500
						—	(.56)		1,500
Windsor Township	—	1	—	—	Mill Creek	X	.45	X	X
Hamburg State School and Hospital						—	.15		X

Table 1. *(Continued)*

Community or township served Water company or authority	Other areas served	Source Primary (1), secondary (2) Streams	 Wells	 Springs	Source and impoundments	Yield from impoundments (mgd) Dependable capacity of groundwater system (mgd)	Rated plant capacity (mgd) Average plant output, 1972 (mgd)	Estimated population served, 1972	Number of services, 1972 Number of metered services, 1972
Womelsdorf-Robesonia	Part of Millcreek Township, Lebanon County	1	3	2	Furnace Creek Reservoir, 66 million gallons Gold Spring Run Schultz Spring 1 well (in Lebanon County)	.53	—	3,930	1,325
Joint Water Authority						.41	.27		1,325
Wyomissing	—	—	—	—	City of Reading	—	—	7,136	1,845
						—	(1.21)		1,845

X Data not available
— Not applicable

was used by private supplies for domestic and stock use in 1951 in Berks County. Most of the 3.4 mgd was groundwater, and this usage probably increased to about 6.0 mgd by 1972. Most of this increase resulted from increased population in areas not served by public supplies.

INDUSTRIAL AND AIR CONDITIONING

Reasonably detailed estimates of self-supplied industrial water use in Berks County are available for 1970. These estimates have been prepared from answers to questionnaires sent to individual users by the Delaware River Basin Commission and the Pennsylvania Department of Environmental Resources. Many of the data have been verified by personal visits.

About 14.5 mgd of groundwater was withdrawn from wells, springs, quarries, and one mine by self-supplied industrial users in Berks County in 1970. An additional 1.4 mgd was used for air conditioning in commercial buildings. All of the air conditioning use and 69 percent of the industrial groundwater use occurred within the study area. In addition to this 15.9 mgd, another 2.7 mgd was pumped to waste from quarries in Berks County. Only 35 percent of the pumpage was from quarries in the study area.

Metropolitan Edison Company used 166.3 mgd of surface water for steam-electric generating at two plants in Berks County in 1970. One of the plants is within the study area, and the other is just south of the study area. These plants take cooling water from Wyomissing Creek and the Schuylkill River. All other industrial uses of surface water in Berks County totaled 2.5 mgd.

Data are available for two earlier inventories of industrial use in Berks County, one in 1951 and one in 1964. Mangan and Graham (1953, p. 4) reported that industries used 5.3 mgd of groundwater and 156.4 mgd of surface water in 1951. The reported 5.3 mgd for groundwater use was probably slightly low, as some users were apparently missed in the survey on which this total was based. This value does not include water use for air conditioning in commercial buildings. Industries in Berks County used 141 mgd of surface water for steam-electric generating and 2 to 3 mgd of surface water for all other uses in 1964. Groundwater use for both industries and commercial air conditioning was 13.2 mgd.

Therefore, there has been little increase in surface-water use except for steam-electric generating, and this increase may be due to annual fluctuations in demand rather than an increasing trend. Despite the destruction of several commercial air conditioning wells in Reading, groundwater use has increased at an annual rate of about 4 percent and will probably continue to increase.

IRRIGATION

Inventories of farm irrigation were conducted in 1966, 1967, and 1968 by the Pennsylvania Department of Agriculture Crop Reporting Service (1967, 1968, 1969). Data from these inventories indicate that in 1966, a year of severe drought from March through August, a total of 418 million gallons of water was used for farm irrigation in Berks County. In 1967, a year of almost average precipitation during the growing season, only 43 million gallons of water was used for farm irrigation. In 1968, a year of below normal precipitation during the growing season, 96 million gallons of water was used for farm irrigation. About 4 percent of the irrigation water was from wells; the remainder was from streams and springs. About 70 percent of the irrigation water used in Berks County in 1966 was applied within the study area. This percentage increased to more than 80 percent in 1967 and 1968.

About 120 million gallons is used for golf course irrigation in Berks County during dry years. About 50 million gallons was used for golf course irrigation in 1971, a year of above normal precipitation. About two thirds of this use was within the limits of the study area. Of the 50 million gallons used in 1971, 6.5 million gallons was from drilled wells (all within the study area).

Thus, irrigation uses less than 100 million gallons in years of above normal precipitation, but total irrigation in Berks County is about 540 million gallons in very dry years. Although 540 million gallons per year is only 1.5 mgd on the average, irrigation use is strongly concentrated in the growing season. Golf courses normally irrigate from May to October, but most farm irrigation takes place in June, July, and August; therefore, peak daily irrigation probably exceeds 10 mgd. About 96 percent of the farm irrigation and 87 percent of the golf course irrigation is from ponds, streams, and springs; the rest comes from wells. Almost half of the farm irrigation systems now in use in Berks County were installed after 1960, primarily as a result of crop losses caused by drought. A considerable increase in the amount of irrigation is likely in the event of another sustained drought. Average irrigation use is small in comparison with either public supply or industrial use.

AVAILABILITY OF WATER

The Schuylkill River, its tributaries within northern Berks County, and the groundwater reservoirs of the study area make up a complex hydrologic system that, when adequately developed, could provide virtually all anticipated future needs of northern Berks County.

This part of the report summarizes present knowledge of the hydrologic system in northern Berks County—the sources, quantity, quality, and distribution of the water, with respect to time and geology. The availability of both surface water and groundwater is governed in part by the amount and variability of precipitation. Also, geology has a pronounced effect on both the quantity and quality of water that may be obtained from streams, springs, or wells in a given locality.

PRECIPITATION

Precipitation is the source of all fresh water in the study area. The average annual precipitation (1931-60) ranges from 41.43 inches at Reading to 46.99 inches at Port Clinton, and the mean for the study area is about 45 inches (U. S. Department of Commerce, Environmental Data Service, 1973). Although precipitation is usually distributed more-or-less evenly throughout the year, the summer has slightly more rainfall than any other season. Much of the summer rain comes as intense thundershowers of short duration. About one tenth of the total precipitation comes as snow. Not all the water in the streams is from local precipitation because some streams carry runoff contributed from outside the study area.

STREAMFLOW

Almost all the water not evaporated or transpired leaves the study area as discharge from streams. This discharge averages 21 inches of the average precipitation of 45 inches on the area. The larger streams and the locations of gaging stations that measure streamflow in northern Berks County are shown in Figure 3. A summary of discharge data for these gaging stations is given in Table 2. More detailed information on streamflow can be obtained from *Water Resources Data for Pennsylvania, Part I, Surface Water Records,* issued annually by the U. S. Geological Survey (1961-74).

WATER BUDGET

The various phases of the hydrologic cycle can be expressed quantitatively in the form of a water budget. As the Tulpehocken Creek basin is underlain by all the rock types present in the study area and drains a significant part of it, a budget study was done for this basin.

In simplified terms, a water budget states that for a given area and interval of time the inflow of water is equal to the outflow plus or minus the change in storage.

The figures in Table 3 show the order of magnitude of the average monthly values for the various terms in the water budget. The water budget data in Table 3 show that the period with the greatest evapotranspiration—May through September—coincides with the period of greatest withdrawal from groundwater and soil-moisture storage. Runoff decreases during this period, as much of the rainfall is stored as soil moisture. The period with the greatest increase in groundwater and soil-moisture storage is from October through January. At the start of this period of recharge almost all of the water being added to storage is held by the soil. Later, especially in January, after the soil-moisture deficit has been satisfied, most of the water being added to storage passes through the soil zone and is stored as groundwater.

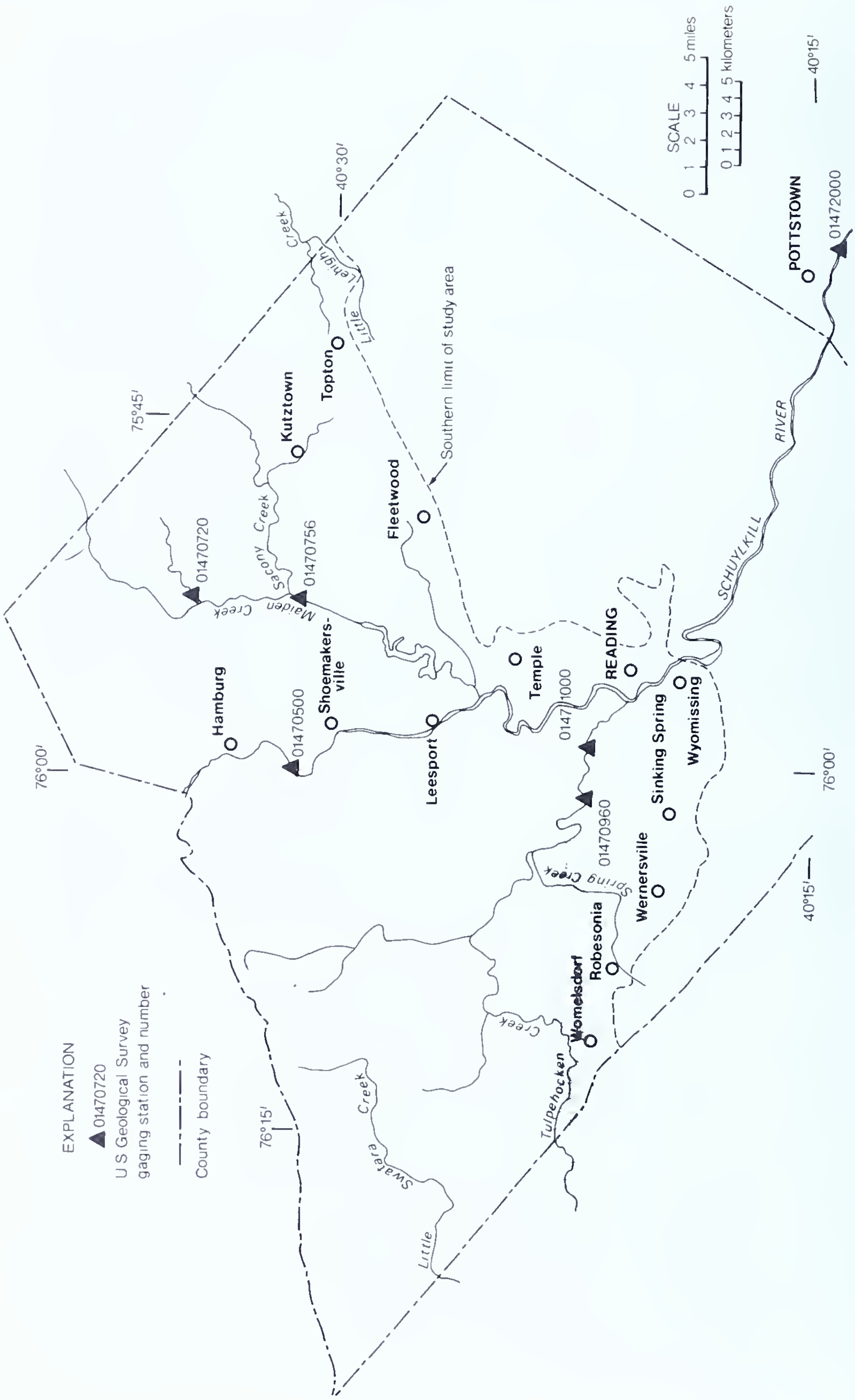

Figure 3. Map showing locations of stream-gaging stations in northern Berks County.

Table 2. *Discharge Data for the Gaged Streams in Northern Berks County*

Station number	Location	Period of record	Average discharge (cubic feet per second)	Maximum discharge (cubic feet per second)	Date of maximum discharge	Minimum discharge (cubic feet per second)	Date of minimum discharge
01470500	Schuylkill River at Bern, Pa.	Aug. 1947 to date	682	42,800	June 22, 1972	31	Sept. 2, 1949
01470720	Maiden Creek tributary at Lenhartsville, Pa.	Oct. 1965 to date	11.5	1,530	June 22, 1972	0	Many days
01470960	Tulpehocken Creek at Blue Marsh damsite near Reading, Pa.	May 1965 to date	253	16,100	June 22, 1972	22	Sept. 11, 12, 13, 1966
01471000	Tulpehocken Creek near Reading, Pa.	Oct. 1950 to date	297	17,000	June 23, 1972	23	Dec. 1, 1964
01472000	Schuylkill River at Pottstown, Pa.	Oct. 1926 to date	1,845	95,900	June 23, 1972	87	Aug. 13, 1930

Table 3. *Average Monthly Water Budget for the Tulpehocken Creek Basin, 1951-73*

Month	Precipitation,[1] in inches	=	Runoff, in inches	+	Evapotranspiration, in inches	+	Change in groundwater storage + Change in soil moisture (in inches)
Jan.	2.81	=	1.83	+	0.05	+	0.93
Feb.	2.90	=	2.20	+	.09	+	.61
March	3.58	=	2.70	+	.36	+	.52
April	3.76	=	2.32	+	.93	+	.51
May	3.80	=	1.72	+	3.62	–	1.54
June	3.88	=	1.41	+	4.37	–	1.90
July	3.83	=	1.09	+	5.34	–	2.60
Aug.	4.26	=	.97	+	4.66	–	1.37
Sept.	3.94	=	.94	+	3.20	–	.20
Oct.	2.76	=	.79	+	1.15	+	.82
Nov.	4.00	=	1.28	+	.26	+	2.46
Dec.	3.70	=	1.84	+	.07	+	1.77
Annual	43.2	=	19.1	+	24.1	+	0.0

[1] Average of data from Myerstown and Strausstown stations

CHARACTERISTICS OF THE AQUIFERS

GEOLOGIC SETTING

The oldest sequence of lower Paleozoic rocks that remains exposed in the study area consists of carbonate rocks with a basal sandstone (Hardyston Formation). These rocks accumulated on a broad, shallow marine shelf that subsided more or less regularly for over 100 million years. Continuous subsidence resulted in the accumulation of many thousands of feet of sediment. The youngest carbonate beds (Myerstown and Hershey Formations), of Middle Ordovician age, were deposited only locally and have characteristics indicating transition of depositional conditions toward that of shale. Elsewhere, the transitional formations were not deposited, and some erosion occurred. A dolomite conglomerate zone in the Hershey Formation represents debris from an eroded area. A younger sequence (Martinsburg Formation of Middle and Late Ordovician age) consists of at least several thousand feet of shale and dirty sandstone that accumulated rapidly over the carbonate sequence. The rapid influx of shale represents the onset of mountain-forming processes (Taconic), which culminated in severe deformation of the rocks.

Many of the thrust faults and major folds are of Taconic age, although both have been appreciably modified by later, less intense deformation. The major structural features consist of great recumbent anticlinal detachments (nappes de recouverture). From the vicinity of Reading eastward into Lehigh County, much of the crystalline rocks and the surrounding Paleozoic sedimentary rocks form the Irish Mountain nappe. The lower limb of the Lebanon Valley nappe overrides the Irish Mountain nappe west of Sinking Spring and forms an area of pervasively overturned rocks. Both of these units have been overridden by rocks of the upper limb and core of the Lebanon Valley nappe from the Lancaster County line to the Reading vicinity. This emplacement is apparently attributable to the later deformation. In each case the rocks did not advance entirely as a unit, but rather as subunits advancing along internal thrusts of various magnitudes and different ages.

The Irish Mountain and Lebanon Valley nappes were derived from different parts of the original carbonate shelf; thus, they differ appreciably in stratigraphic detail. The rocks of these nappe systems have been designated the Lehigh Valley sequence and the Lebanon Valley sequence from the areas where each is characteristically exposed. From oldest to youngest, the carbonate rocks of the Lehigh Valley sequence are the Leithsville, Allentown, Stonehenge, Rickenbach, Epler, Ontelaunee, and Jacksonburg Formations. The carbonate rocks of the Lebanon Valley sequence are (in ascending order) the Lower and Middle Cambrian carbonate rocks, undifferentiated, of northern Conestoga Valley affinities (possibly Ledger and Zooks Corner Formations), and the Buffalo Springs, Snitz Creek, Millbach, Richland, Stonehenge, Rickenbach, Epler, Ontelaunee, Annville, Myerstown, and Hershey Formations.

An assemblage of rocks of at least Early to Middle Ordovician age in Berks County south of Shochary Ridge is characterized by rock types not present in the Martinsburg Formation to the east. These rocks are called the Hamburg sequence in this report (MacLachlan and others, 1975, p. 67). Epstein and others (1972, p. D29) refer to the sequence as the Hamburg klippe and suggest that the limestone slump blocks present in the klippe were (1) deposited on a northwest-facing bank in the ''proto-Atlantic'' ocean east of their present location, (2) remobilized and transported partly by turbidity currents and as slumps onto a slope, and (3) subsequently broken up into blocks that slid into deeper water. These rocks were later displaced northwestward to their present position on top of the Martinsburg Formation by thrusting during Taconic tectonism. Geologic mapping by P. B. Myers (written conmunication, 1971) and Alterman (1971) indicated that several distinct lithic assemblages can be mapped within the Hamburg sequence. Most of these assemblages (referred to as lithotectonic units in this report) are thrust or possibly gravity-slide slices. These lithotectonic units probably were stacked in their present order and later thrust on top of the Martinsburg Formation as one large, structurally complex sheet. Despite the presence of a few limestone and dolomite beds in the Hamburg sequence, the Hamburg sequence and the Martinsburg Formation are discussed throughout much of this report under the collective term ''noncarbonate rocks.''

The Taconic deformation took place shortly after deposition of the Martinsburg, and there is substantial evidence that the latter was not entirely lithified at the time. About 200 million years later the rocks were again deformed in the Alleghanian orogeny.

The major structural grain defined by typical bedding attitudes is roughly east-northeast to west-southwest. Southerly dips of 20 to 80 degrees predominate over most of the area, but part of the recorded dips represent overturned strata. The dominant deformational mode is thrust faulting from the south or southeast that commonly emplaced older strata on younger. Despite the predominance of southerly dips, the combined effect of the thrusting and prevalence of overturned beds is to expose progressively older rocks southward from the Ordovician shales to the Precambrian gneisses, though folding causes reversals in the trend.

The Silurian red beds, sandstone, and conglomerate (Rose Hill, Tuscarora, and Bloomsburg Formations) exposed on and north of Blue Mountain overlie the Ordovician shales and sandstones. These are the youngest consolidated rocks in the study area except for a few diabase dikes and sills (Triassic) that cut the Cambrian-Ordovician carbonates.

Plate 1 is a geologic map showing well locations. The character of the various geologic units and their water-bearing properties are given in Table 4.

Table 4. *Geologic Units and Their Water-Bearing Properties*

System	Geologic unit	Thickness (in feet)	Character of rocks	Water-bearing properties
Triassic	Diabase	1-100	Dikes and sills.	Few wells have penetrated this unit in the study area. Based on data from other areas in Pennsylvania it has a median yield of about 10 gpm.
Silurian	Bloomsburg Formation	1,800	Red, thin- and thick-bedded shale and siltstone with local units of sandstone and thin impure limestone; some green shale in places.	Not tapped by wells in the study area. In Schuylkill County, nondomestic wells have a median yield of 130 gpm (Biesecker and others, 1968, p. 118).
	Rose Hill and Tuscarora Formations, undifferentiated	2,700	Rose Hill—Light-gray sandstone interbedded with red shale, siltstone, and sandstone. Tuscarora—Light-gray thick-bedded sandstone, conglomeratic in part.	Data are scarce. It probably yields small to moderate supplies in the valleys but crops out mostly on a high ridge where yields will be small. Some failures to obtain domestic supplies can be expected.
Ordovician	Spitzenberg Conglomerate[1] and sandstone of Sharps Mountain[2]	>425	Coarse-grained gray and red sandstone and limestone-pebble conglomerate. The conglomerate contains some pebbles of sandstone, quartzite, shale, quartz, and red jasper.	Not tapped by wells.
	Shochary Sandstone[3]	Unknown	Medium- to fine-grained, well-sorted, even-bedded, calcareous sandstone.	Too few data are available to evaluate the water-bearing properties of this unit.
	Unnamed	Unknown	Chiefly gray shale.	Wells generally yield adequate supplies of water for domestic use.

Table 4. *(Continued)*

System	Geologic unit	Thickness (in feet)	Character of rocks	Water-bearing properties
Ordovician				
	Martinsburg Formation			
	Pen Argyl Member	3,000-6,000	Thick-bedded, dark-gray to grayish-black, medium-gray- to yellowish-brown-weathering claystone slate interbedded with thin beds of quartzose slate and grayish-black to nearly black, carbonaceous claystone slate.	Median yield of nondomestic wells is about 125 gpm.
	Ramseyburg Member	2,800	Interbedded sequence of dark-gray, medium-gray- to yellowish-brown-weathering, medium- to thick-bedded, graded graywacke and graywacke siltstone.	Median yield of nondomestic wells is about 25 gpm.
	Bushkill Member	4,000	Thin-bedded, dark-gray, medium-gray- to yellowish-brown-weathering claystone slate. Unit contains minor thin interbeds of graywacke siltstone, carbonaceous slate, and dolomitic siltstone near the base.	Median yield of nondomestic wells is about 25 gpm.
	Hamburg sequence			
	Lithotectonic unit 8	Unknown	Buff- and olive-weathering, gray shale with interbeds of predominantly fine-grained graywacke.	Median yield of domestic wells is 20 gpm.
	Lithotectonic unit 7	Unknown	Olive-weathering gray shale and maroon shale with minor beds of fine-grained brown sandstone.	Median yield of domestic wells is 11 gpm. Specific-capacity data indicate that this is a low-yielding unit. Wells will rarely yield more than 25 gpm.
	Lithotectonic unit 6	Unknown	Greenish-brown siltstone, claystone, and shale with interbeds of limestone and brown quartz-pebble graywacke conglomerate.	Median yield of nondomestic wells is 140 gpm. Median yield of domestic wells is 30 gpm. One of the highest yielding units of the Hamburg sequence.

Lithotectonic unit 5	Unknown	Purple, green, tan, and olive shale. Minor beds of limestone.	Too few data are available to evaluate the water-bearing properties of this unit.
Lithotectonic unit 4	Unknown	Interbedded greenish-gray micaceous siltstone in thick to massive beds and limestones of various types (edgewise conglomerate, calcilutite, and calcarenite).	Median yield of nondomestic wells is 62 gpm. Median yield of domestic wells is 20 gpm. One of the higher yielding units of the Hamburg sequence.
Lithotectonic unit 3	Unknown	Interbedded red and olive siltstone and shale, bedded chert, siliceous shale, and limestone-pebble graywacke conglomerate.	Median yield of nondomestic wells is 30 gpm. Median yield of domestic wells is 20 gpm. Very few wells in this unit will produce as much as 100 gpm.
Lithotectonic unit 2	Unknown	Interbedded limestone and graded to massively bedded, micaceous shale and siltstone; massively bedded calcarenite associated with the limestone.	Median yield of nondomestic wells is 68 gpm. Median yield of domestic wells is 20 gpm. One of the higher yielding units of the Hamburg sequence.
Lithotectonic unit 2A	Unknown	Black and gray slate and shale, dolomitic in places. Light-gray-weathering, medium- to dark-gray ribbon limestones interbedded with the slate and shale at a few localities. Limestone-pebble conglomerate with a black slate matrix and light-gray sandy limestone conglomerates are also present.	Similar to lithotectonic unit 2.
Lithotectonic unit 1	Unknown	Brown or gray calcareous graywacke interbedded with olive-weathering gray shale and slate, quartzite, graywacke, and quartzite conglomerate containing shale, chert, and limestone fragments, red and green shale and slate, and minor beds of limestone and siliceous shale and chert.	Median yield of nondomestic wells is 75 gpm. Median yield of domestic wells is 20 gpm.

Table 4. *(Continued)*

System	Geologic unit	Thickness (in feet)	Character of rocks	Water-bearing properties
Ordovician	Lehigh Valley sequence			
	Jacksonburg Formation	0-250	Dark-gray to nearly black, fine-grained, argillaceous limestone.	Poorly permeable aquifer. Median yield of nondomestic wells is 30 gpm. Median yield of domestic wells is 10 gpm.
	Lebanon Valley sequence			
	Hershey Formation	800-1,200	Dark-gray argillaceous limestone. Dolomite conglomerate in lower part.	Poorly permeable aquifer. Median yield of domestic wells is 15 gpm. Water-bearing properties are very similar to those of the Jacksonburg Formation.
	Myerstown Formation	0-200	Gray crystalline thin-bedded limestone; carbonaceous at base.	Median yield of domestic wells is 20 gpm. One of the lowest yielding carbonate rocks in Berks County.
	Annville Formation	200	Light-gray-weathering, finely crystalline, thick-bedded, high-calcium limestone.	Permeability unknown. Not an important aquifer because of small areal extent.
	Lehigh Valley sequence and Lebanon Valley sequence			
	Beekmantown Group			
	Ontelaunee Formation	600-700	Medium-dark-gray dolomite with medium-gray mottled interbeds of limestone; dark-gray chert beds near base.	Good aquifer. Median yield of nondomestic wells is 105 gpm. Some wells will yield 1,000 gpm or more.
	Epler Formation	800	Interbedded medium-gray limestone and dolomite, with calcarenite lenses.	Excellent aquifer. Median yield of nondomestic wells is 275 gpm. Wells yielding 1,000 gpm or more are common.

	Rickenbach Formation	600	Medium- to medium-dark-gray, cherty dolomite with subordinate limestone interbeds.	No data are available from nondomestic wells that could be used to properly evaluate the unit. Meisler (1963, p. 22) noted that the scanty data available (in Lebanon County) indicate that it may yield large supplies of water to wells. Median yield of domestic wells is 28 gpm.
	Stonehenge Formation	150-250	Medium-gray limestone with abundant shaly to siliceous laminae, calcarenite lenses, and intraformational conglomerate; dolomite interbeds near base. Disappears eastward, apparently by lateral gradation to Rickenbach Formation.	Based on specific-capacity data given by Meisler (1963, p. 20) for Lebanon County, this is probably an excellent aquifer. Not important in Berks County because of small areal extent.
Cambrian	Lehigh Valley sequence			
	Allentown Formation			
	Maiden Creek Member		Predominantly gray dolomite to silty dolomite with abundant thin-bedded to nodular, dark chert; usually thick bedded with subordinate interbedded limestone; algal laminite structures; some oolite, and sharpstone conglomerate.	Excellent aquifer. Median yield of nondomestic wells is 210 gpm. Many wells are capable of yielding 1,000 gpm or more.
	Muhlenberg Member		Predominantly gray dolomite to silty dolomite; usually thick bedded with interbedded limestone, calcareous sandstone, and some shale; algal laminite structures common; some oolite, and sharpstone conglomerate.	Median yield of nondomestic wells is 60 gpm. Many wells are capable of yielding 1,000 gpm or more.
	Tuckerton Member		Predominantly gray dolomite to silty dolomite; usually thick bedded with interbedded limestone and particularly prominent cyclic algal and oolite beds near top; some sharpstone conglomerate; beds tend to be more calcareous and shaly toward base, and may be older than otherwise equivalent Conococheague Group.	Median yield of nondomestic wells is 68 gpm.

Table 4. *(Continued)*

System	Geologic unit	Thickness (in feet)	Character of rocks	Water-bearing properties
Cambrian	Lebanon Valley sequence			
	Conococheague Group			
	Richland Formation	1,700	Predominantly gray dolomite, thick-bedded, with subordinate interbeds of limestone deposited in shallow water. Limestone somewhat more abundant in middle of formation. Dolomitic and sandy toward base.	Excellent aquifer. Median yield of nondomestic wells is 200 gpm. Many wells will yield 1,000 gpm or more.
	Millbach Formation	>1,000	Interbedded limestone and dolomite, predominantly light-gray to occasionally pinkish-gray, especially toward west. Algal structures and intraformational conglomerates widely distributed.	Good aquifer. Median yield of nondomestic wells is 190 gpm.
	Snitz Creek Formation	>500	Medium-gray dolomite, coarsely crystalline, oolitic, and cherty; sandstone beds near top.	Based on specific-capacity data given by Meisler (1963, p. 19) for Lebanon County, this is probably a fair aquifer, but not important because of small areal extent.
	Buffalo Springs Formation	>500	Interbedded limestone and dolomite, predominantly light-gray to occasionally pinkish-gray, especially toward the west; rather shaly, sandy in part; algal structures locally abundant, especially near top.	Median yield of nondomestic wells is 60 gpm. About 25 percent of the wells drilled in this unit have yields of 200 gpm or more.
	Lehigh Valley sequence			
	Leithsville Formation	1,000	Predominantly gray dolomite with considerable chert in lower part; shaly in upper part. Poorly exposed.	Median yield of nondomestic wells is 110 gpm.

Lebanon Valley sequence			
Lower and Middle Cambrian carbonate rocks, undifferentiated, of northern Conestoga Valley affinities	1,000	Predominantly dolomite, in part light-gray, massively bedded (Ledger Formation?), also medium-bedded, sometimes shaly (Zooks Corner Formation?). Also, isolated calcareous and shaly areas may in part be Buffalo Springs Formation.	Median yield of nondomestic wells is 75 gpm. East of Reading this aquifer does not yield adequate water for public supply and industrial use.
Antietam and Harpers Formations	200	Dark-gray-green, silty meta-argillite, graded, thin to medium beds, variably disrupted, irregularly fractured with poor cleavage.	Not tapped by wells.
Hardyston Formation	250-600	Quartzose and feldspathic sandstones and quartzites; conglomerate near the base.	Median yield of nondomestic wells is 31 gpm. Occasional wells located near the contact with the carbonate rocks may have yields of several hundred gallons per minute.

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[1] Of Whitcomb and Engle (1934).

[2] Of Platt and others (1972).

[3] Of Willard and Cleaves (1939).

SPECIFIC CAPACITY

Specific-capacity (discharge divided by drawdown) data for the study area are given in the record of wells (Table 14) and summarized for domestic wells in Table 5 and for nondomestic wells in Table 6. Most of the specific-capacity data presented in this report are based on pumping-test results reported by drillers and consultants. A few tests, mostly on domestic wells, were conducted by the U. S. Geological Survey. An example of how a well is test pumped is shown in Figure 4.

Specific capacities of nondomestic wells are higher than specific capacities of domestic wells by almost an order of magnitude. Part of the difference is due to the fact that the nondomestic wells are, on the average, deeper and penetrate more water-bearing zones than the domestic wells. Also, a disproportionate share of the nondomestic wells are in valleys, and wells located in valleys generally have higher specific capacities than those in other topographic settings. A small part of the difference can be attributed to the slightly larger diameter of the nondomestic wells. The specific capacities from the nondomestic wells would have been even higher if the nondomestic wells had not been pumped at higher rates and for longer periods of time than the domestic wells.

Specific-capacity data on nondomestic wells, together with data on available drawdown, provide a reasonable base for estimating yields of wells penetrating the various formations. Probably at least 50 feet of drawdown is available in most nondomestic wells in the study area. The data from domestic wells can at least be used to predict which are the best and which are the poorest formations. The values for domestic wells (Table 5) in the Conococheague Group are misleadingly low due to small sample size and deliberate collection of data on very deep wells, which makes for an unusual concentration of poor wells in the sample.

The shale units having the highest transmissivities generally are those that contain some limestone or dolomite (lithotectonic units 2 and 4 of the Hamburg sequence). The carbonate rocks having the lowest transmissivities are those that contain large amounts of clayey material (Hershey and Jacksonburg Formations) or contain significant amounts of shale (Tuckerton Member of the Allentown Formation, Buffalo Springs Formation, Lower and Middle Cambrian rocks, undifferentiated, and Leithsville Formation).

WELL YIELD

Median reported yields of nondomestic wells for many of the geologic units in the study area are given in Table 7. Many of the better wells were not tested at their full capacity, so the values given in the table for well yields higher than the median are probably somewhat low. Median yields are given in Table 4 for almost all of the geologic units in the study area. If data are needed on frequency distribution of yields for those units not listed

Table 5. *Specific Capacities of Domestic Wells*[1]

Geologic unit	Median depth of wells used in frequency distribution (in feet)	Number of wells used in frequency distribution	Specific capacity (gallons per minute per foot drawdown) exceeded by indicated percentage of wells[2]				
			10 percent	25 percent	50 percent (median)	75 percent	90 percent
Martinsburg Formation	200	11	7.6	0.67	0.09	0.04	0.02
Hamburg sequence	123	195	2.0	.75	.32	.16	.07
Lithotectonic unit 8	140	5	—	—	.18	—	—
Lithotectonic unit 7	195	9	.36	.27	.12	.04	.01
Lithotectonic unit 6	147	10	6.6	6.0	1.2	.18	.07
Lithotectonic unit 4	125	28	6.0	1.1	.60	.24	.08
Lithotectonic unit 3	132	20	.82	.49	.24	.11	.06
Lithotectonic unit 2	122	27	3.0	1.5	.29	.15	.05
Lithotectonic unit 1	120	92	1.3	.75	.34	.21	.10
Jacksonburg Formation	200	3	—	—	.52	—	—
Hershey Formation	170	16	.71	.34	.14	.07	.05
Myerstown Formation	200	9	30.	.59	.33	.15	.09
Annville Formation	158	3	—	—	.23	—	—
Beekmantown Group	189	27	11.	1.9	.43	.07	.01
Ontelaunee Formation	233	10	13.	1.7	.29	.06	.01
Epler Formation	140	13	3.4	1.8	.40	.07	.01
Rickenbach Formation	176	4	—	—	.46	—	—
Allentown Formation	142	23	8.0	2.7	.50	.27	.06
Maiden Creek Member	111	9	20.	4.5	1.4	.92	.27
Muhlenberg Member	176	12	8.0	.58	.39	.08	.03
Conococheague Group	138	5	—	—	.34	—	—
Leithsville Formation	192	4	—	—	1.0	—	—
Hardyston Formation	195	3	—	—	.40	—	—

[1] Includes a few stock and commercial wells.

[2] Specific-capacity data are not adjusted to a common period of time, but almost all were measured after 1 or 2 hours.

Table 6. *Specific Capacities of Nondomestic Wells*[1]

Geologic unit	Median depth of wells used in frequency distribution (in feet)	Number of wells used in frequency distribution	Specific capacity (gallons per minute per foot drawdown) exceeded by indicated percentage of wells[2]				
			10 percent	25 percent	50 percent (median)	75 percent	90 percent
Hamburg sequence	300	53	4.8	2.0	0.98	0.28	0.13
Lithotectonic unit 4	335	8	22.	5.2	1.4	.25	.05
Lithotectonic unit 3	425	3	—	—	.47	—	—
Lithotectonic units 2 and 2A	415	9	4.3	3.0	1.7	.22	.14
Lithotectonic unit 1	300	30	4.3	1.6	.96	.31	.12
Beekmantown Group	265	22	265.	58.	8.4	1.4	.23
Ontelaunee Formation	247	9	33.	22.	1.9	.58	.17
Epler Formation	283	13	480.	130.	12.	5.9	.40
Conococheague Group	314	36	200.	78.	9.4	1.5	.17
Richland Formation	300	26	230.	110.	14.	2.4	.28
Millbach Formation	431	10	130.	9.8	3.8	.25	.01
Allentown Formation	252	47	100.	32.	11.	1.3	.71
Maiden Creek Member	310	24	200.	36.	14.	2.1	.50
Muhlenberg Member	280	8	150.	26.	14.	3.2	.70
Tuckerton Member	220	15	60.	25.	2.9	1.2	.72
Buffalo Springs Formation	478	8	17.	13.	2.6	.27	.22
Lower and Middle Cambrian carbonate rocks, undifferentiated	296	20	53.	12.	.35	.10	.04
Leithsville Formation	385	27	45.	6.8	2.4	.63	.21
Hardyston Formation	288	16	5.6	1.6	.57	.21	.09

[1] Includes public supply, industrial, air conditioning, and irrigation wells.

[2] Specific-capacity data are not adjusted to a common period of time, but most were measured after 4 to 72 hours.

A = Depth to static-water level in feet
B = Depth to pumping-water level in feet
Drawdown = B-A
C = Maximum possible drawdown
Q = Yield in gallons per minute

$$\text{Specific capacity} = \frac{\text{Yield}}{\text{Drawdown}} = \frac{Q}{B\text{-}A}$$

For example: water stands 62 feet below the surface before a well is pumped (A = 62 feet). The pump is run for an hour and is measured by filling a 55-gallon drum in 10 minutes ($Q = \frac{55}{10} = 5.5$ gallons per minute). The water level is then found to be 73 feet below the surface of the ground (B = 73 feet). The drawdown is then 73 – 62 = 11 feet and the specific capacity is $\frac{5.5}{11} = 0.5$ gallon per minute per foot of drawdown. If the well is 100 feet deep, the maximum possible drawdown (C) is 100 – 62 = 38 feet. Therefore, the maximum rate at which the well could ever be pumped is $0.5 \frac{\text{gpm}}{\text{feet}} \times 38$ feet = 19 gallons per minute.

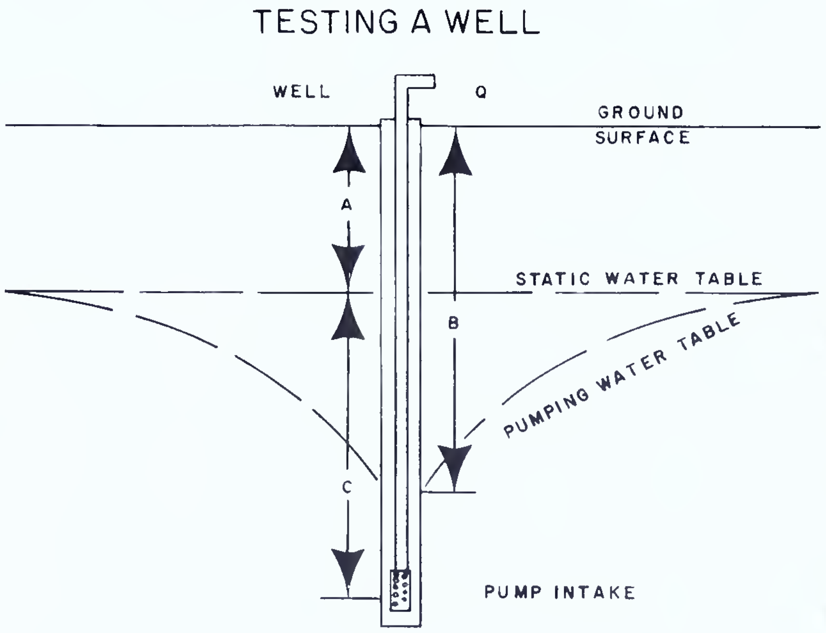

Figure 4. Diagram showing how a pumping test is made (from Landers, 1976, p. 37)

Table 7. *Reported Yields of Nondomestic Wells*[1]

Geologic unit	Median depth of wells used in frequency distribution (in feet)	Number of wells used in frequency distribution	Yield (gallons per minute) exceeded by indicated percentage of wells: 10 percent	25 percent	50 percent (median)	75 percent	90 percent
Hamburg sequence	300	73	170	120	65	30	15
Lithotectonic unit 6	397	4	—	210	140	40	—
Lithotectonic unit 4	335	12	150	125	62	26	6
Lithotectonic unit 3	325	7	110	70	30	8	8
Lithotectonic units 2 and 2A	382	12	210	135	68	28	15
Lithotectonic unit 1	300	37	180	120	75	48	15
Jacksonburg Formation	250	7	330	100	30	22	7
Beekmantown Group	234	34	700	400	150	33	11
Ontelaunee Formation	213	15	410	200	105	33	13
Epler Formation	298	18	1000	480	275	27	5
Conococheague Group	300	61	520	400	200	25	6
Richland Formation	291	47	520	400	200	25	6
Millbach Formation	412	14	590	340	190	16	3
Allentown Formation	240	73	610	330	200	35	13
Maiden Creek Member	268	36	630	460	210	120	20
Muhlenberg Member	248	17	660	510	60	14	3
Tuckerton Member	223	20	325	200	68	30	20
Buffalo Springs Formation	405	17	380	170	60	38	13
Lower and Middle Cambrian carbonate rocks, undifferentiated	302	33	460	240	75	20	4
Leithsville Formation	388	32	500	220	110	45	12
Hardyston Formation	290	21	115	75	31	12	6

[1] Includes public supply, industrial, air conditioning, and irrigation wells.

in Table 7, some estimate can be made by comparing specific capacities for the domestic wells given in Table 5.

TRANSMISSIVITY

Fifteen pumping tests were conducted to determine transmissivity. Most of the drawdown and recovery curves from the longer pumping tests (more than 4 hours) were somewhat irregular. Thus, transmissivities estimated from specific-capacity data are probably more satisfactory than those calculated from pumping tests for the fractured rocks of Berks County. Using methods described by Walton (1962, p. 12-13), transmissivities were determined from median specific-capacity data given in Table 6 (or Table 5 if no data were available from nondomestic wells). Lithotectonic units 1, 3, and 7 of the Hamburg sequence, the Hershey, Myerstown, Jacksonburg, Buffalo Springs, and Hardyston Formations, and the Lower and Middle Cambrian carbonate rocks, undifferentiated, all have transmissivities less than 200 ft^2/day. Most of the other formations have transmissivities that range from 1,000 to 4,000 ft^2/day.

FACTORS AFFECTING WELL YIELD AND SPECIFIC CAPACITY

WATER-BEARING ZONES

The yield of a well depends largely on the size and distribution of water-bearing zones open to the well. In the rocks of northern Berks County, the water-bearing zones are almost entirely confined to secondary openings along bedding planes and joints, faults, and other fractures. Some of these openings have been enlarged by solution in the carbonate rocks, but most are only a fraction of an inch wide. Drillers' records indicate that no more than 5 percent of all the wells that have been drilled in the carbonate rocks of the study area have penetrated water-bearing openings as much as 1 foot wide. An example of a large solution opening is shown in Figure 5. Figure 6 shows irregular weathering of the bedrock surface with isolated boulders above it.

Table 8 shows the distribution of water-bearing zones with depth for several aquifers within the study area. Most of the data used in the table were reported by drillers. Data were tabulated for 230 wells in the Hamburg sequence and 197 wells in the carbonate rocks.

The depth-frequency distribution of water-bearing zones is somewhat similar for each of the units of the Hamburg sequence. Differences in the distribution of water-bearing zones below 250 feet are probably due to small sample sizes. The number of water-bearing zones penetrated is greater

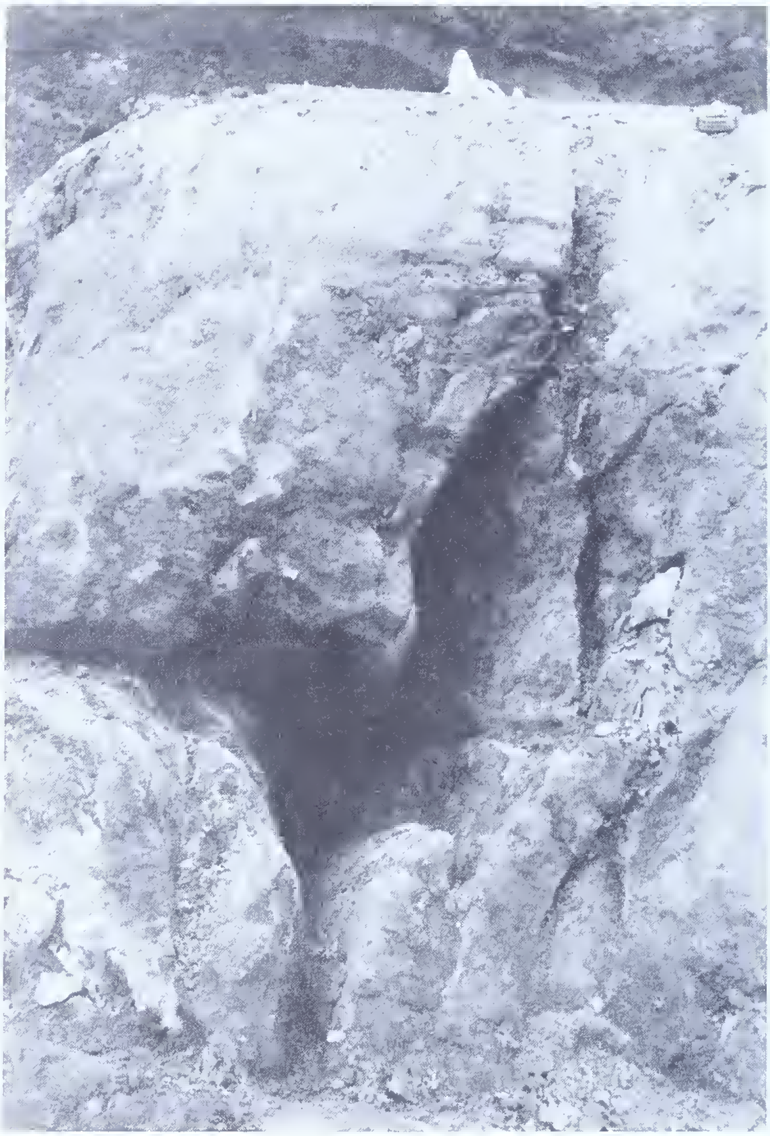

Figure 5. Solution opening at intersection of two fractures in Allentown Formation. Opening was filled with silty clay prior to excavation. Note 2-foot rule for scale at top. (Photograph courtesy of Gannett Fleming Corddry and Carpenter, Inc.)

in the first 300 feet of the Hamburg sequence than in the same interval in the carbonate rocks. However, as well yields are generally higher in the carbonate rocks, the yields of the individual zones must, on the average, be much greater in the carbonate rocks. The number of zones penetrated in the Hamburg sequence decreases with depth, and below 300 feet relatively few zones are encountered. Assuming the yield is proportional to the number of water-bearing zones, drilling more than 300 feet or perhaps 400 feet below land surface will only rarely produce significant increases in the yields of wells.

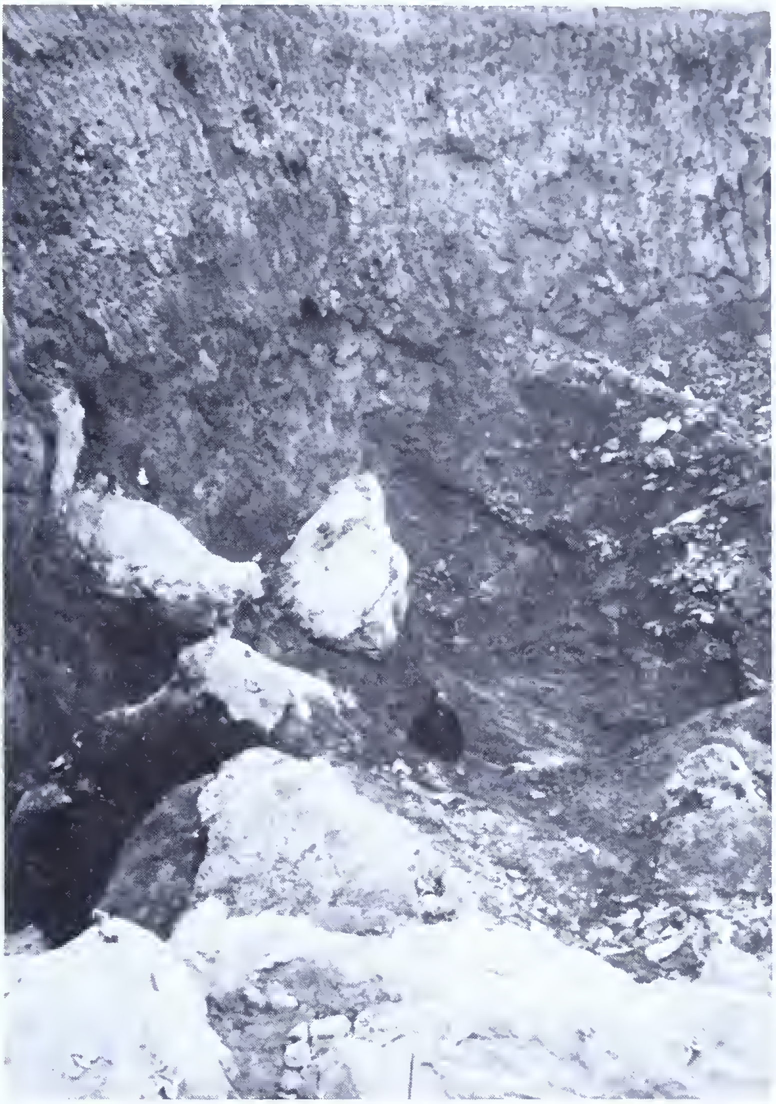

Figure 6. Irregular top of bedrock surface of Allentown Formation in foreground and detached boulders in background. Man is standing 32 feet (10 m) below land surface at top of photograph. (Photograph courtesy of Gannett Fleming Corddry and Carpenter, Inc.)

The number of zones penetrated in the carbonate rocks also decreases with depth, but the decrease is not as pronounced as in the Hamburg sequence. Wood and others (1972, p. 165), working in similar carbonate rocks in adjacent Lehigh County, reported that significant quantities of water were obtained from zones as deep as 600 feet below the land surface. They also noted that most fractures became closed between 600 and 850 feet below land surface, and relatively little water flow takes place below 850 feet. Thus, drilling wells to depths of more than about 600 feet is impractical in carbonate rocks.

Table 8. *Distribution of Water-Bearing Zones with Depth*

	Number of zones for which data were available	Number of water-bearing zones penetrated by drilled wells per 100 feet of hole sampled[1]						
		0–50 feet	51–100 feet	101–150 feet	151–200 feet	201–250 feet	251–300 feet	Below 300 feet
Hamburg sequence, lithotectonic unit 1	303	2.7	3.3	2.4	2.0	1.0	1.6	0.63
Hamburg sequence, lithotectonic units 2 and 2A	101	2.9	2.9	2.0	1.4	1.3	.92	.43
Hamburg sequence, lithotectonic unit 3	71	3.1	3.0	1.8	1.8	1.2	.58	.80
Hamburg sequence, lithotectonic unit 4	68	3.7	2.8	2.4	1.8	2.0	—	—
Hamburg sequence, all	609	3.0	3.0	2.2	1.8	1.1	1.2	.58
Beekmantown Group	111	1.7	1.1	1.7	1.2	1.2	.63	.80
Conococheague Group	99	3.3	1.6	2.1	2.1	.77	.76	.74
Allentown Formation	147	2.4	2.8	2.2	1.7	2.2	1.5	.57
Leithsville Formation	56	1.7	1.6	2.5	1.3	.60	1.0	.91
Carbonate rocks, all	550	1.8	1.8	1.7	1.5	1.1	.87	.83

[1] Based on data reported by drillers. Depths below land surface are given in 50-foot increments to 300 feet. For each depth range shown, the total number of water-bearing zones penetrated by all the wells for which data are available has been multiplied by 100 and divided by the total footage that was drilled. As drillers very rarely report information above the bottom of the casing, the footage cased out is not included in the footage sampled. Also, the footage that lies above the water table is not included.

FRACTURE TRACES

Fracture traces have been defined by Lattman (1958, p. 569) as natural linear features consisting of topographic (including straight stream segments), vegetational, or soil-tonal alinements, which are visible primarily on aerial photographs for continuous distances of less than 1 mile. Fracture traces are probably the surface expression of vertical or nearly vertical fractures (individual joints, zones of closely spaced joints, or small-scale faults) in the underlying bedrock (Lattman, 1958). Fracture traces in northern Berks County were located on areal photographs at a scale of 1:20,000 and transferred to Plate 2. Hydrologists and geologists in other areas have reported that wells drilled on fracture traces have higher yields than randomly located wells (Lattman and Parizek, 1964; Parizek and Drew, 1966). However, when the well data available for the study area were compared with the fracture traces on Plate 2, it did not show that this is true in northern Berks County. This may be due to the difficulty encountered in determining if a well is actually on a fracture trace without a precise field location.

TOPOGRAPHY

All wells inventoried during the investigation were placed in one of three categories that best describe their topographic position. The three categories are (1) hilltop, (2) slope or hillside, and (3) creek valley or river valley. A comparison of the specific capacities (most determined from 1-hour tests) of all the tested wells in each of these topographic positions shows that topography has a significant effect on the specific capacity of the wells. Table 9 shows that the highest median specific capacities were obtained from wells in valleys, and the lowest were obtained from wells on hilltops. Valleys are probably formed in areas of intense fracturing that are able to transmit more groundwater than hilltop and hillside areas, where fewer fractures are generally present.

Table 9. ***Median Specific Capacities of Wells by Topographic Position***

Geologic unit	Number of wells tested	Median specific capacity, in gpm/ft		
		Valley	Hillside	Hilltop
Hamburg sequence				
Lithotectonic unit 1	122	0.86	0.36	0.24
Lithotectonic units 2 and 2A	38	1.5	.40	.24
Lithotectonic unit 4	36	1.1	.67	.26
Beekmantown Group	49	2.4	.11	—
Conococheague Group	40	12.0	2.3	—
Allentown Formation	70	5.0	4.0	.70
Buffalo Springs Formation	9	8.0	2.5	—
Leithsville Formation	30	4.7	1.2	—

WELL DEVELOPMENT

Some attempts to develop wells in the carbonate rocks of Berks County have involved setting off explosive charges in the well to increase fracturing. Few, if any, of these attempts have improved well yields. Treating wells with chemicals has rarely been tried in the carbonate rocks. Treatment with hydrochloric acid may improve the yields of some wells in limestone. Where dolomite is present, a reagent that hastens solution by catalytic action must be added to the acid.

Carswell and others (1968, p. 32) improved the specific capacity of one well about 67 percent by a surging and bailing technique. This well and another were also treated with hexametaphosphate. The specific capacities of the two wells were improved by 40 percent and 24 percent, respectively, as a result of the chemical treatment. Both of these wells were drilled in noncarbonate rocks correlative with and similar to rocks in northern Berks County.

Wells with adequate yields may need development because they produce turbid water. About half the wells that produce turbid water are successfully cleared by pumping the wells to waste for periods that may range from a few hours to several months. Many wells must be pumped at rates much lower than the maximum yield of the well in order to produce clear water. Pumping turbid wells at very high rates usually does not clear the wells and may cause the wells to collapse.

WELL INTERFERENCE

When closely spaced wells are pumped simultaneously, the areas influenced by pumping may overlap, and the wells compete for the same water. Minimum well interference is a factor in obtaining maximum yields for individual wells. Generally, well interference increases as the distance between wells decreases. The following table gives theoretical drawdowns after 180 days for distances of 500, 1,000, and 1,500 feet from wells with discharges, transmissivities, and storage coefficients typical of the various aquifers in the study area:

			Drawdown, in feet		
Discharge (gpm)	Transmissivity (ft^2/day)	Storage coefficient	at 500 ft	at 1,000 ft	at 1,500 ft
30	200	0.04	4.8	2.0	<1
30	200	.01	7.6	4.6	3.0
100	1,000	.01	7.7	5.6	4.4
500	1,000	.04	28	18	12
500	4,000	.04	9.7	7.0	5.5
500	10,000	.04	4.5	3.5	2.9

Drawdowns were computed by a method described by Theis (1963). The storage coefficient is assumed to be approximately equal to the specific yield—about 0.01 for the noncarbonate aquifers and 0.04 for the carbonate aquifers. The transmissivities for the various aquifers are given in a preceding section of this report.

The drawdowns given in the table are for an isotropic and unbounded aquifer. In reality, recharge or impermeable boundaries will always be present, and drawdowns will be greater than or less than those shown in the table. Also, in fractured bedrock aquifers, interference is generally greatest along some preferred direction. In the noncarbonate rocks the interference is usually maximum between wells along a line parallel to the strike or cleavage of the rocks. In carbonate rocks, a line of solution openings will often coincide with the line of maximum interference. Locations of solution openings are controlled primarily by joints rather than bedding or cleavage.

Despite these limitations, the table can be used to give a general idea of interference between wells and minimum well spacings necessary to avoid excessive interference. Drawdown is directly proportional to discharge. For example, a well in a noncarbonate aquifer (storage coefficient equals 0.01 and transmissivity equals 1,000 ft^2/day) would produce a drawdown of 7.7 feet at 500 feet pumping at 100 gpm for 180 days or a drawdown of 15.4 feet pumping at 200 gpm. Interference is cumulative and at any given well is the sum of the drawdowns produced at that point by each well in the vicinity.

In the noncarbonate rocks, high-capacity wells located less than 1,500 feet apart are subject to mutual interference. In the carbonate rocks, high-capacity wells may be located as little as 100 feet apart without causing excessive interference in areas of high transmissivity. High-capacity wells located at least 1,000 feet apart are not subject to excessive interference in areas of moderate to low transmissivity.

MOVEMENT OF GROUNDWATER

WATER-LEVEL MAP

Most of the groundwater in northern Berks County is derived from precipitation within Berks County. In the areas underlain by noncarbonate rocks, the water table is essentially a subdued replica of the land surface; precipitation infiltrates to the water table and flows downslope to points of discharge in the valleys. Groundwater rarely flows more than a few thousand feet in these rocks.

In the carbonate rocks, groundwater may flow for several miles before reaching points of discharge. In these rocks, the approximate direction of flow can be determined from water-level contour maps. A water-level contour map, based on measurements in April 1972, has been prepared for that part of northern Berks County underlain by carbonate rocks (Plate 2). In most areas, water-level elevations were determined by subtracting depth to water below land-surface elevations interpolated from 7½-minute topographic maps. Near the topographic divide between Little Lehigh and Saucony Creeks, land-surface elevations were obtained by leveling from bench marks. The map was prepared for a period of relatively high water level. Changes in water level between April and early November 1972 are also shown on Plate 2.

Several uses can be made of the water-level map in addition to the obvious interpretation arising from the fact that water moves from areas of high water level toward those of low water level. For example, areas of low water-level slope coincide with areas of high transmissivity, and areas of high water-level slope coincide with areas of low transmissivity, if recharge is assumed to be uniform over all areas. A few prominent ridges can be seen in the water-level contour map. Most of them result from high water levels in shale outliers or in low-permeability carbonate rocks (Jacksonburg, Hershey, and Myerstown Formations).

GROUNDWATER FLOW TO STREAMS

Streamflow can be separated into two components: direct runoff and base runoff. Base runoff, or fair-weather runoff, is sustained by and is composed largely of groundwater discharge to streams. Approximately 76 percent of the annual streamflow of Tulpehocken Creek at Reading (gaging station 01471000) is base runoff (Biesecker and others, 1968, p. 29). In 1974, 68 percent of the annual streamflow of Maiden Creek at Virginville (gaging station 01470756) and 64 percent of the annual streamflow of an unnamed tributary to Maiden Creek at Lenhartsville (gaging station 01470720) were base runoff.

Groundwater contribution to streamflow in the study area is related to the amount of carbonate rock in the drainage basin. The unnamed tributary to Maiden Creek at Lenhartsville drains an area almost entirely underlain by shale and sandstone and has the lowest percentage of base runoff. Tulpehocken Creek drains an area underlain by the highest percentage of carbonate rocks (36 percent) and has the highest percentage of base runoff of the three gaging stations. In addition, Wood and others (1972, p. 42) present data showing that for areas underlain mostly by carbonate rocks, up to 90 percent of the streamflow is base runoff.

Relatively high base flows are associated with streams draining mostly carbonates, but the streams may go dry during extreme droughts. Willow and Little Lehigh Creeks are the only major streams in the study area known to have gone dry during the drought of the 1960's. An examination of the water levels measured in the fall of 1972 (shown as a change from the April measurements on Plate 2) shows that some reaches of these streams are perched during periods of low water level. Loss of streamflow to the underlying carbonate rocks causes the streams to go dry. The Schuylkill River, Tulpehocken Creek, and Sacony Creek act as principal drains for parts of the carbonate valley and are not subject to going dry except in their extreme headwaters (see Plate 2).

WATER-LEVEL FLUCTUATIONS

The principal changes in water levels are seasonal. Water levels generally start to decline in March or April and continue to decline until late fall. Even though precipitation is greater during the summer than during the winter, less precipitation reaches the water table during the summer and fall because large amounts of water are evaporated from the soil and transpired by vegetation. Rain and snow melt recharge the aquifers during the winter and early spring, and water levels generally rise during this period. Natural annual fluctuations of water levels in wells generally range from 3 to 20 feet. Tropical Storm Agnes (June 1972) caused groundwater levels to be much higher than normal in Be–205 and probably over much of the study area.

Figure 7 shows typical hydrographs for two observation wells in the carbonate rocks of northern Berks County for 1971-74. The two hydrographs are very similar, although that for well Be–205 exhibits somewhat sharper peaks. Despite the general pattern of water-level declines starting in March or April, substantial amounts of recharge took place during August 1971, June 1972, and June 1973 as a result of higher-than-normal precipitation.

The approximate magnitude of the seasonal fluctuations within the carbonate rocks is shown on Plate 2. Water-level changes were calculated by subtracting water levels measured in April 1972 from those measured in November 1972. Except for the area west and northwest of Reading, most of the larger areas showing declines of 10 feet or more are on or near groundwater divides. The groundwater divides shift slightly with seasonal changes in water level.

Isolated areas having large declines or moderate rises in water level from April to November commonly occur within the carbonate valley near the contact with the noncarbonate rocks (Plate 2). Most of the rises are a result of recharge from losing streams that flow from areas of noncarbonate rocks into the carbonate valley. Apparently, much of the recharge did not reach the water table until after the April measurements, perhaps due to slow downward movement through thick overburden. Most of the large declines are associated with groundwater mounds developed in rocks of lower-than-normal transmissivity. These mounds decline to nearly regional water levels during the summer when little recharge takes place. At least one such mound occurs near the middle of the carbonate valley. Increases or decreases in discharge rates from pumped wells between the April and November measurements also produced isolated areas of large declines or rises in the water level.

Although seasonal fluctuations in groundwater levels in the carbonate rocks are usually less than 20 feet, water levels locally undergo more extreme variations, especially between droughts and periods of average or above average precipitation. The drought of 1963-67 caused groundwater levels to be below normal for several successive years. For example, the water level in well Be–555 near Maxatawny was 110 feet below land surface on

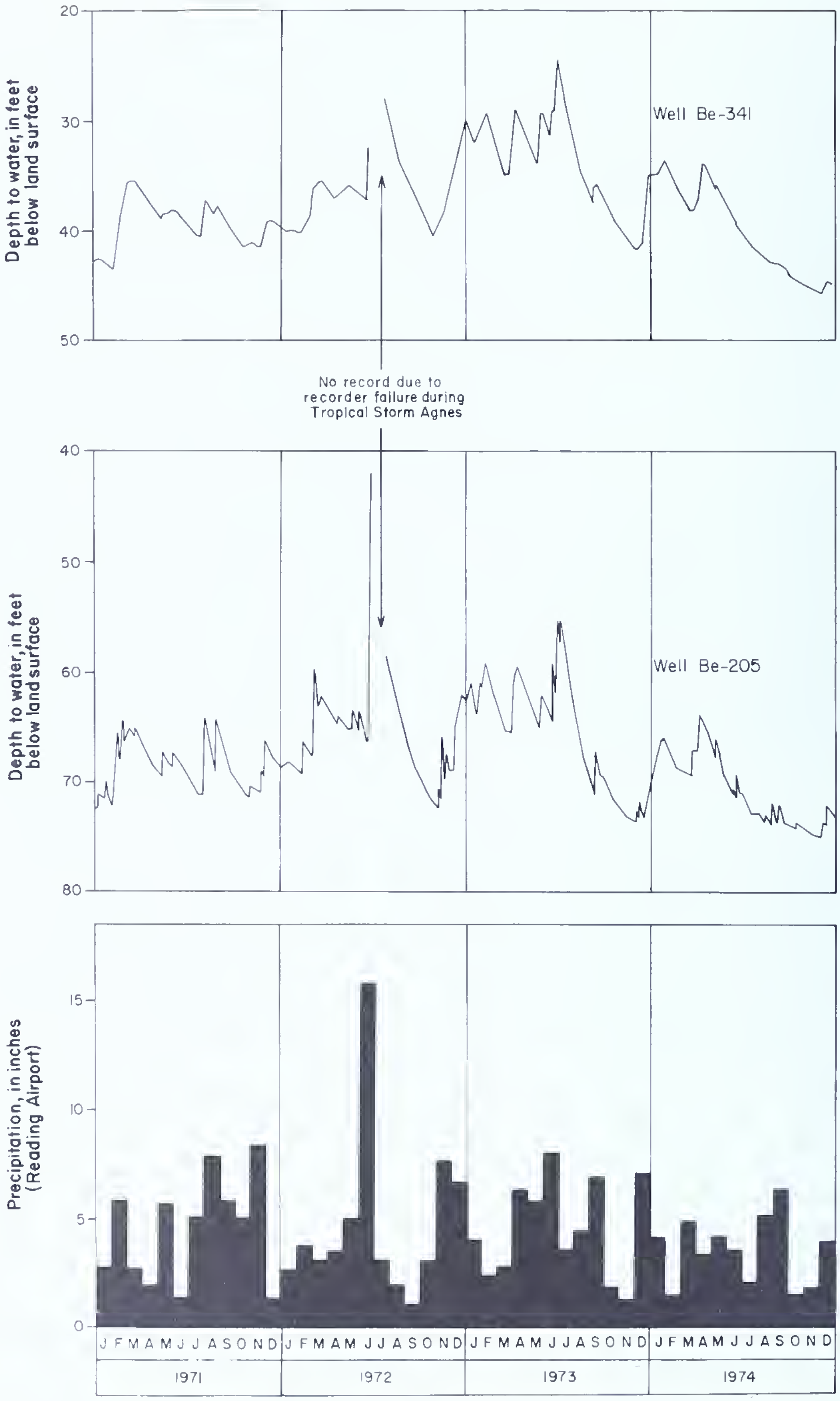

Figure 7. Hydrographs for observation wells Be-341 and Be-205, and monthly precipitation at Reading, 1971-74.

October 14, 1968, after a dry period. In March 1972, after a period with above average precipitation, the water level was only 35 feet below land surface. Water levels in several other wells near Maxatawny in the northeastern part of the study area also rose more than 30 feet during this period.

Seasonal water-level fluctuations in the noncarbonate rocks are similar in magnitude to those in the carbonate rocks. Because storage is small in the noncarbonate rocks and water levels recover quickly, long-term declines in water level due to successive years of drought are not likely. There has been no long-term decline in water levels throughout the county, but cones of depression can occur within a few thousand feet of heavily pumped well fields.

SPRINGS

Data for springs located on Plate 1 are given in Table 10. Big Spring (Be–Sp–10) has the largest measured discharge. This spring, whose drainage area lies to the west of its point of discharge, results from overflow of a groundwater dam formed by shale and carbonate rocks of low permeability that crop out just east of the spring. Several other springs are present near Big Spring. During periods of high water level, Be–Sp–16, near Kutztown, and the other springs nearby probably have the largest discharge of any group of springs in Berks County.

The general absence of very large springs in the carbonate valley indicates that most of the discharge from the aquifer enters the streams from small springs along the banks and in the channel.

QUALITY OF WATER

Laboratory analyses by the U.S. Geological Survey of water from 82 wells and 6 springs are given in Tables 11 and 12. Most of the analyses in Table 11 are summarized in Table 13, which gives median concentrations of chemical constituents in water from selected geologic units. The results of field determinations of specific conductance, hardness, and pH are given in the record of wells (Table 14).

NATURAL QUALITY

The groundwater of northern Berks County is usually of very good quality, although the carbonate rocks usually yield hard to very hard water. The water from most of the aquifers is calcium bicarbonate in type, and pH generally ranges from 6.0 to 8.4.

A map of water hardness is presented in the upper right-hand corner of Plate 1. The hardness data were collected over a substantial period of time, and no corrections have been made for seasonal differences and other changes with time, but the map does appear to be adequate to illustrate general patterns of water hardness. A clear distinction can usually be made on the hardness map between carbonate and noncarbonate rocks. However, within the areas underlain by each of these rock types, residence time, topography, land use, and other factors are as important as geology in controlling hardness. As a result, some areas of soft or hard water cut across several different geologic units.

Groundwater movement across geologic contacts may also account for some of the lack of agreement between geologic contacts and boundaries of hardness. The hardness map (Plate 1) shows that between South Mountain and the Reading Prong, where the Great Valley adjoins the Triassic Lowland, the water in the carbonate rocks is very hard. Somewhat softer water is present in the carbonate rocks adjacent to the mountains. The rocks that constitute most of the Reading Prong contain relatively soft water—the median hardness for the Hardyston Formation is 19 mg/l, and that for the metamorphic rocks is 52 mg/l (Biesecker and others, 1968, p. 140). Apparently the carbonate aquifers receive substantial amounts of soft to moderately hard water flow from the rocks of the Reading Prong. Thus, the aquifers that generally crop out closest to the mountains—the Leithsville and Allentown Formations—have more dilute water than the other carbonate aquifers (see Table 13).

A similar relationship can be seen in the noncarbonate rocks along the south side of Blue Mountain. Soft water is generally present near the mountain, whereas moderately hard water is generally present farther south. This does not appear to be related to local topography, as the median hardness of water from drilled wells in the noncarbonate rocks is the same on hilltops and hillsides and only 20 percent higher in valleys.

In the carbonate rocks, hardness of water is a little lower in the divide areas than in areas of groundwater discharge to the major streams. This is probably directly related to average residence time of water in the aquifers, which should be greatest near points of discharge.

Calcium magnesium ratios clearly illustrate the influence of lithology on groundwater quality. The median calcium magnesium ratio is 1.2 for the Leithsville and Allentown Formations, which are composed chiefly of dolomite. The median calcium magnesium ratio for the other carbonate rocks is 2.9 and reaches a maximum of about 7 in water from wells penetrating nearly pure limestone.

Temperature of water from 74 drilled wells ranged from 10°C to 17°C, and the median was 12°C. Most of the temperatures above 14°C were in areas where heated water was being returned to the aquifer or in heavily urbanized areas, where the warmer microclimates associated with cities had significantly warmed the aquifer. Water temperature was not related to rock type. Seasonal variations in water temperature are small (generally less than 2°C) in water from drilled wells.

WATER QUALITY PROBLEMS

For the constituents shown in Table 11 maximum allowable concentrations as defined and recommended by the U.S. Environmental Protection Agency (1975) were exceeded by one or more constituents in water from 27 of 82 wells. Iron exceeded 300 μg/l in water from 4 of 29 wells in the noncarbonate rocks and from 8 of 53 wells in the carbonate rocks. Manganese exceeded 50 μg/l in water from 3 of 38 wells in the noncarbonate rocks and from 5 of 53 wells in the carbonate rocks. Dissolved-solids concentration exceeded 500 mg/l in water from 1 of 29 wells in the noncarbonate rocks and from 4 of 52 wells in the carbonate rocks. Nitrate exceeded 10 mg/l (as nitrogen) in water from 3 of 29 wells in the noncarbonate rocks and from 5 of 53 wells in carbonate rocks. Environmental Protection Agency recommended limits generally were not greatly exceeded, and only the high nitrate concentrations are a hazard to health. The high local concentrations of nitrate are not natural for the area and are derived mostly from crop fertilizers, on-lot sewage disposal, and barnyard wastes.

Analyses were made for nickel, copper, lead, cadmium, chromium, mercury, and zinc on a few samples of groundwater. The amounts detected were generally below Environmental Protection Agency recommended limits, except for an area of Muhlenburg Township and an area in the vicinity of Sinking Spring. In addition to these two areas, analyses by the Pennsylvania Department of Environmental Resources indicate that in a small area just north of Topton concentrations of hexavalent chromium are about twice the Environmental Protection Agency recommended limit of 50 μg/l.

Samples were collected in and around an area of high fluoride concentration in Muhlenberg Township. Two sources of fluoride are indicated by two separate areas of high concentrations shown in Figure 8. Both sources are leakage from ponds in which soluble industrial wastes were stored. The source for the larger area was just east of Tuckerton, very near a groundwater divide (see Plate 2). Apparently a small part of the fluoride moved northward, while the remainder flowed to Mammoth Spring (Be-Sp-7) and other points of discharge along the Schuylkill River. All of the samples in which fluoride was determined were also analyzed for hexavalent chromium. Chromium was detected only in Mammoth Spring (153 μg/l), in water from well Be-293 (22 μg/l in a bailed sample and 230 μg/l in a pumped sample), and in water from well Be-586 (25 μg/l in a bailed sample). Although dumping of fluoride- and chromium-bearing wastes was discontinued several years ago, concentrations in the groundwater along Laurel Run from South Temple to the Schuylkill River still exceed the Environmental Protection Agency recommended limits of 1.5 μg/l for fluoride and 50 μg/l for hexavalent chromium.

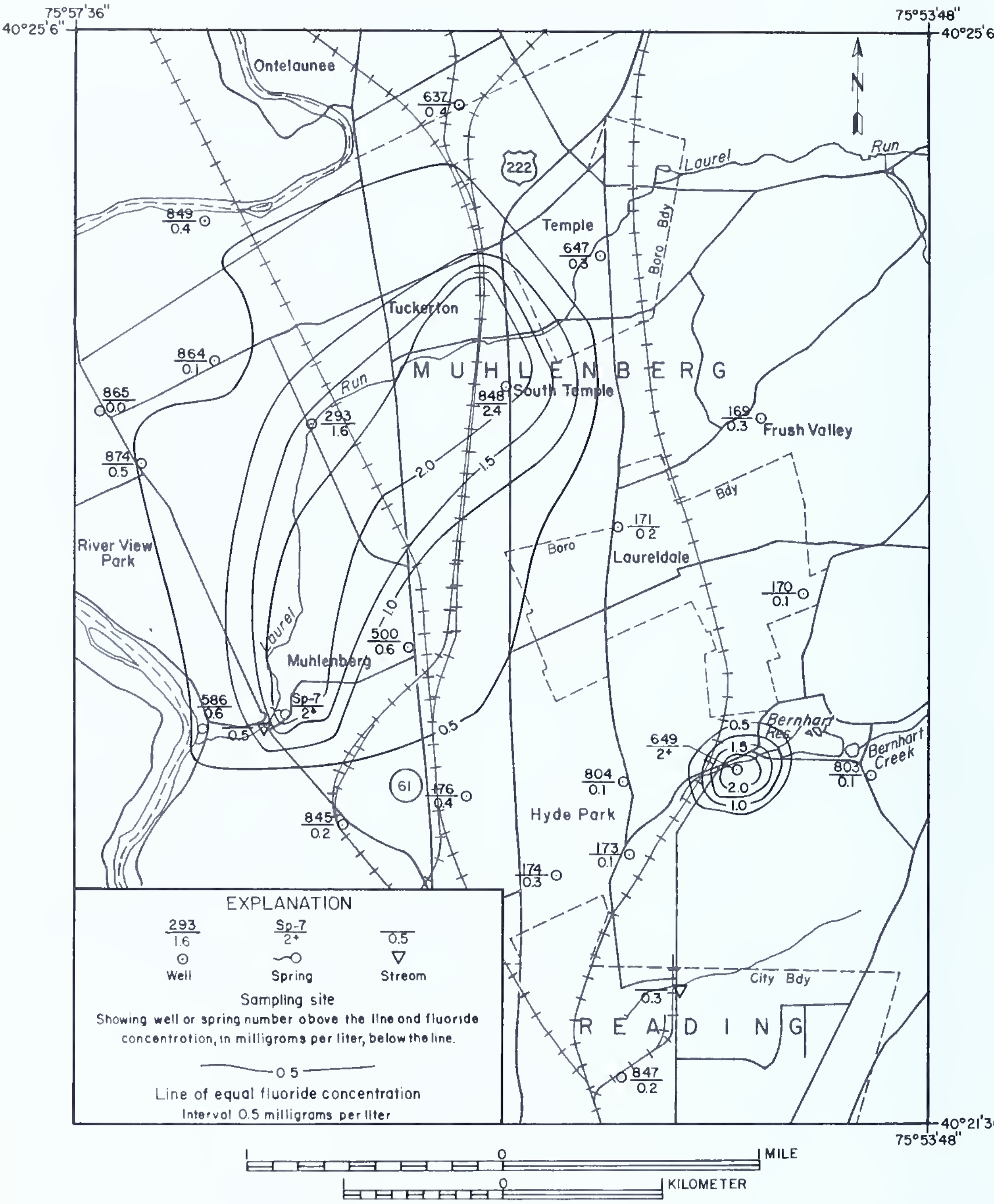

Figure 8. Map of Muhlenberg Township showing fluoride concentrations during late June 1971. Base map adapted from U. S. Geological Survey Temple and Reading 7½-minute quadrangles.

Chromium wastes have also entered the groundwater at Sinking Spring. Figure 9 shows the extent of high chromium content. A high-capacity well at the site (Be-422) was pumped to waste intermittently between December 1968 (when the chromium was discovered) and April 1971 (when the

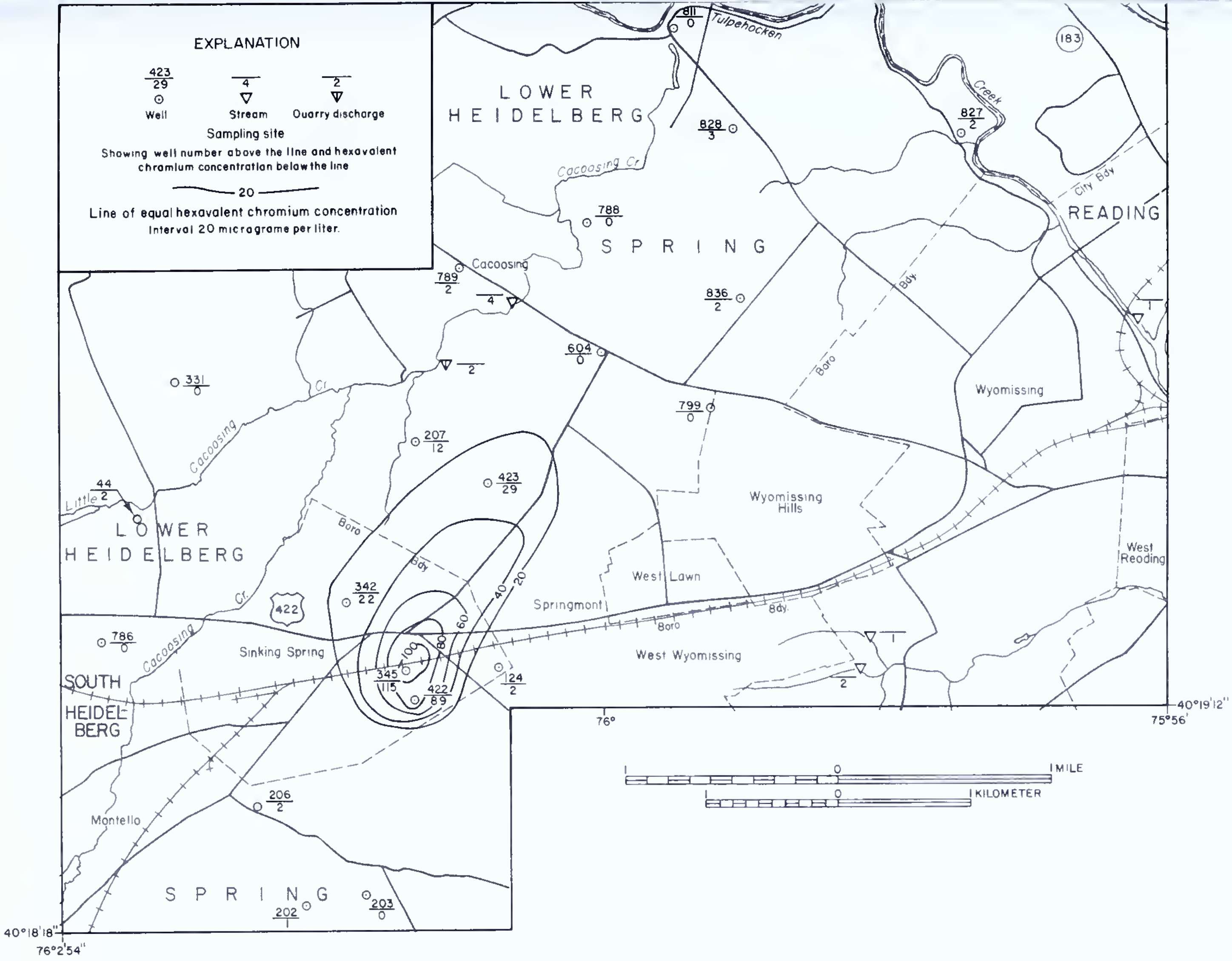

Figure 9. Map of Sinking Spring and vicinity showing concentrations of hexavalent chromium during April 1971. Base map adapted from U. S. Geological Survey Sinking Spring and Reading 7½-minute quadrangles.

samples were collected). In addition, several industrial wells remained in use in the area.

This pumpage removed much high-chromium water and resulted in reducing its extent. Only in a small area in the Borough of Sinking Spring were concentrations of hexavalent chromium in the groundwater in excess of 50 μg/l in April 1971.

Wells drilled in the Pen Argyl Member of the Martinsburg Formation often encounter water high in hydrogen sulfide at depths of 100 to 150 feet below land surface. The concentrations present do not appear to be a hazard to health, but the hydrogen sulfide does impart an unpleasant taste and odor.

Several widely scattered wells have been polluted by petroleum products. The petroleum products detected in this study have come from leaky storage tanks, broken pipelines, accidental spills, and deliberate dumpage. Once in the ground, petroleum products remain for long periods of time; one area near Sinking Spring was polluted by a gasoline spill in the early 1930's and remains polluted 40 years later. The lighter fractions (especially gasoline) impart very objectional tastes to water; thus, the utility of groundwater is seriously impaired where petroleum products are present.

SOURCES OF WATER FOR FUTURE USE

It is impossible to give precise figures on the maximum amount of groundwater available for future use in northern Berks County. This amount will be governed not only by natural controls but also by the amount of reuse of water. Some estimates for the total amount of groundwater that could be developed are given below. Wood and others (1972) working in Lehigh County showed that the carbonate rocks of the Great Valley have sustained yields to wells of at least 0.5 mgd/mi^2. Thus, widely spaced wells in the 140 square miles of highly permeable carbonate rocks of the study area (excluding the carbonate rocks of the Hamburg sequence) are capable of a combined sustained yield of about 70 mgd. This figure is probably too low, as it does not take into account water that would become available from reuse and from induced recharge to the aquifers from the Schuylkill River. Also, these values are based on the assumption that the groundwater divides would stay in their present locations. Pumping 70 mgd would cause all the streams and springs in the area underlain by carbonate rocks (except the Schuylkill River) to go dry at least part of the time, unless a large part of the used water is returned to the streams. Also, the rate of sinkhole development may be increased if large quantities of groundwater are pumped.

If 0.2 mgd/mi^2 can be obtained from the 400 square miles of the study area underlain by noncarbonate rocks, they could yield at least another 80 mgd to wells. These rocks, however, are much less permeable than the carbonate rocks, and a large number of widely spaced wells would be necessary to obtain this much water. Most of the surface water used in the area in 1972 was obtained in areas underlain by noncarbonate rocks, and the quantity available would be reduced somewhat by heavy pumpage from wells.

In summary, at least 150 mgd of groundwater could be pumped in northern Berks County without reuse. This amount would produce large drawdowns during long periods of deficient precipitation. As only 20 mgd of groundwater was being used in the area in 1970, large amounts of groundwater can be developed in the future.

Of the major municipalities now depending on water from the carbonate rocks, Kutztown, Muhlenberg Township, Sinking Spring, Topton, and Wernersville should all be able to pump substantially larger amounts of water than they are presently using. Fleetwood, Womelsdorf, Robesonia, and the small villages, which do not tap the carbonate-rock aquifers for their primary source of supply, could also develop water from the carbonate rocks adequate to meet all their foreseeable needs. Mount Penn could obtain some additional water from the carbonate rocks. However, the amount that could be pumped by Mount Penn is somewhat limited by the presence of low-permeability boundaries and an area of very low yielding carbonate rock. The populations of the municipalities in the area underlain by noncarbonate rocks are small. Thus, despite the lower yields of these rocks, these municipalities should be able to obtain adequate groundwater for public supply and industrial use.

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FACTORS FOR CONVERTING ENGLISH UNITS TO METRIC UNITS

Factors are shown to four significant figures.

English	*Multiply by*	*Metric*
acre-ft (acre-feet)	1.233×10^{-3}	hm^3 (cubic hectometers)
ft^3/s (cubic feet per second)	2.832×10^{-2}	m^3/s (cubic meters per second)
ft (feet)	3.048×10^{-1}	m (meters)
gallons	3.785	l (liters)
gpd (gallons per day)	4.381×10^{-5}	l/s (liters per second)
gpm (gallons per minute)	6.308×10^{-2}	l/s (liters per second)
in. (inches)	2.540×10^{1}	mm (millimeters)
mi (miles)	1.609	km (kilometers)
mi^2 (square miles)	2.590	km^2 (square kilometers)
mgd (millions of gallons per day)	4.381×10^{1}	l/s (liters per second)
million gallons	3.785×10^{-3}	hm^3 (cubic hectometers)

TABLE 10. RECORD OF SPRINGS

Spring number: A serial number assigned to the spring when it was first visited.
Location number: Degrees, minutes, and seconds of latitude and longitude, respectively.
Aquifer: Rock unit from which the spring issues.

Discharge: M, measured; E, estimated; R, reported.
Estimated discharge characteristics: Maximum, median, and minimum discharges have been estimated using all available reported, estimated, and measured discharges.
Use: H, domestic; N, industrial; P, public supply; S, stock; T, institution; U, unused.

Spring number	Location number Lat.	Location number Long.	Owner	Altitude above sea level (feet)	Aquifer	Discharge (gpm)	Date measured or estimated	Estimated discharge characteristics (gpm) Max.	Med.	Min.	Use	Temperature (°C)	Remarks
Be-Sp-6	402101	761055	Bethany Childrens Home	510	Snitz Creek Formation	700 68	E 11-18-70 M 11-10-71	700	50	20	T	11.0	Minimum estimated discharge was reported.
7	402258	755639	Paul Snyder (Mammoth Spring)	240	Allentown Formation (Muhlenberg Member)	890	M 11- 9-71	---	700	---	U	11.0	Several openings; fluoride content >2 mg/l on 6-15-71.
8	405633	755616	Carpenter Technology Corp.	205	Allentown Formation (Maiden Creek Member)	40	E 3-17-65	---	40	---	N	---	Pumped at 350 to 750 gpm.
9	401934	755606	Hopper Paper Co.	198	Buffalo Springs Formation	250	R 3-17-65	---	---	---	N	---	Completely enclosed.
10	402055	760700	Frederick B. Thompson (Big Spring)	365	Epler Formation	2640	M 11-10-71	3000	2000	---	H,S	11.0	Flow reported as 2,100 gpm in 1952. Other large springs nearby.
11	401928	760107	(Sinking Spring)	323	Richland Formation	0	M 5-28-71	---	0	0	U	---	Flows only rarely and for short periods of time.

12	402035	760056	Laura Reedy	277	Ontelaunee Formation	340	M	11-10-71	---	250	---	U	11.0	---
14	402823	755339	Allentown Portland Cement Co.	320	Jacksonburg Formation	150	E	8-10-71	---	150	---	N	---	---
15	402741	755318	City of Reading (Peters Creek Spring)	320	Ontelaunee Formation	2270	M	11- 8-71	---	2000	---	P	11.0	Flows to reservoir.
16	403058	754545	Kutztown Borough	405	Epler Formation	900	M	11- 8-71	---	600	0	U	10.5	Reported to go dry during severe droughts. Other large springs nearby.
17	402536	755538	Cecelia Geiles	280	Allentown Formation (Tuckerton Member)	900	E	3-17-72	---	500	---	U	10.5	Hardness = 85 mg/l.
18	402537	755534	Myers Canning Co.	280	Allentown Formation (Tuckerton Member)	900	E	3-17-72	---	500	0	U	---	Other large springs nearby.

TABLE 11. CHEMICAL ANALYSES OF WATER FROM WELLS IN BERKS COUNTY

Well number	Date of collection	Temperature (°C)	Silica (SiO_2)	Total iron (Fe) (μg/l)	Total manganese (Mn) (μg/l)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3), as N	Orthophosphate (PO_4) as P	Dissolved solids (residue on evaporation at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos per cm^2 at 25°C)	Field pH
																	Calcium, magnesium	Noncarbonate		
Well in Martinsburg Formation, Pen Argyl Member																				
Be- 182	6-02-64	---	6.3	140	30	1.2	1.5	.5	.2	9	1.8	.6	.0	.00	---	11	9	2	16	---
Wells in Martinsburg Formation, Bushkill Member																				
Be-1092	12-16-71	12.4	10	140	40	31	7.2	5.9	.5	96	35	3.3	.0	.00	.01	148	107	29	229	7.7
1093	12-16-71	---	9.2	20	40	58	4.0	4.4	.6	120	63	8.7	.0	.68	.00	208	161	63	318	7.8
1094	12-16-71	---	5.6	80	10	155	10	8.5	1.8	180	135	79	.0	18	.00	570	428	280	899	7.2
Well in Shochary Sandstone																				
Be-1158	8-29-72	---	10	20	0	11	2.2	43	1.1	94	15	9.2	.8	.60	.00	160	37	0	264	---
Well in Hamburg sequence, lithotectonic unit 7																				
Be- 911	12-15-71	---	12	50	10	7.0	4.7	4.2	1.4	16	14	4.0	.0	5.0	.01	76	37	24	111	6.4
Wells in Hamburg sequence, lithotectonic unit 6																				
Be- 785	12-16-71	---	11	350	10	46	4.8	6.7	4.0	100	20	14	.0	13	.00	188	135	53	312	7.6
968	12-17-71	---	19	10	20	33	12	12	1.1	56	51	16	.0	11	.01	216	132	86	328	6.4
Wells in Hamburg sequence, lithotectonic unit 5																				
Be-1102	6- -68	---	---	0	20	---	8.1	---	---	---	34	---	.1	7.5	---	200	---	---	---	---
1103	6- -68	---	---	30	10	---	10	---	---	---	105	---	.0	7.5	---	416	---	---	---	---
1104	6- -68	---	---	0	20	---	6.5	---	---	---	20	---	.1	7.9	---	120	---	---	---	---

Wells in Hamburg sequence, lithotectonic unit 4

Be- 962	12-17-71	---	11	70	10	73	6.0	5.6	1.8	203	30	8.0	.0	1.9	.00	249	207	40	392	7.0
1088	12-20-71	---	14	1000	10	16	6.4	6.2	1.8	55	19	4.1	.0	3.8	.00	100	67	22	174	6.0
1097	12-17-71	---	8.5	70	10	11	8.4	3.2	1.8	21	10	9.0	.0	10	.02	109	62	45	167	6.4

Wells in Hamburg sequence, lithotectonic unit 3

Be- 357	12-15-71	---	17	30	30	17	4.2	17	1.1	98	11	4.4	.1	1.4	.00	116	60	0	186	7.3
565	3-27-59	11	24	170	50	56	12	7.4	1.1	166	44	6.0	.0	2.0	---	241	189	53	379	---
956	12-17-71	---	13	10	60	30	10	5.2	.6	131	19	4.4	.0	.09	.00	144	116	9	243	7.4

Wells in Hamburg sequence, lithotectonic unit 2A

Be- 162	5-18-64	13	12	120	0	14	6.8	75	.5	171	24	43	.2	.05	---	267	63	0	449	---
259	12-20-71	---	9.6	120	10	29	7.2	6.0	.5	81	27	9.0	.0	4.5	.00	145	102	36	236	7.8

Wells in Hamburg sequence, lithotectonic unit 2

Be- 129	5-03-49	---	14	230	---	24	6.8	5.4	.7	79	30	1.8	.1	.02	---	123	88	23	198	---
922	12-15-71	---	12	80	10	51	3.8	5.6	.8	143	32	2.7	.1	1.4	.01	172	143	26	294	7.7

Wells in Hamburg sequence, lithotectonic unit 1

8e- 130	1-09-63	12	21	620	50	38	9.2	6.8	.8	144	26	1.9	.1	.07	---	178	133	15	297	---
165	5-18-64	---	5.5	1000	90	7.2	7.3	3.3	.3	36	15	3.3	.0	6.2	---	94	48	19	154	---
213	11-18-71	11	12	370	10	8.3	3.0	5.0	1.7	49	.4	.6	.0	.02	.01	62	33	0	86	6.8
325	9-30-71	---	12	10	40	54	10	15	.9	111	67	22	.3	5.0	.00	264	176	85	421	---
396	1-09-63	12	14	40	140	38	5.8	5.2	.8	124	11	6.1	.1	1.9	---	150	119	18	265	---
518	7-28-65	---	17	160	0	30	4.4	5.7	.8	122	3.0	1.6	.0	.09	---	119	92	0	196	6.7
519	7-28-65	---	14	30	0	35	5.4	5.3	1.1	91	21	7.2	.0	5.6	---	157	110	35	250	7.0
520	7-28-65	12	15	20	0	30	4.9	5.7	.7	65	8.2	23	.0	4.5	---	178	94	42	234	7.1

Wells in Jacksonburg Formation

Be- 417	4-06-65	12	8.2	140	0	102	22	21	6.0	272	104	52	.0	.04	.00	522	345	122	750	7.7
418	4-06-65	11	13	1500	0	74	22	8.1	.2	284	58	3.9	.1	.04	.00	317	275	43	533	7.8
752	12-14-71	---	9.2	100	20	114	9.9	9.2	.6	233	70	24	.0	5.9	.00	318	325	134	584	7.3
768	12-14-71	---	12	10	60	101	11	12	2.5	179	82	45	.1	4.7	.00	386	297	151	628	7.9
995	12-17-71	---	6.7	60	0	113	13	3.5	3.8	286	92	12	.0	2.3	.03	465	336	101	685	7.0
1058	12-20-71	---	7.4	30	30	100	31	9.6	.5	264	114	37	.0	.07	.00	394	377	161	698	7.1
1096	12-17-71	11	12	20	120	122	16	7.0	1.4	241	164	21	.0	1.7	.00	502	371	173	731	6.9

TABLE 11. (CONTINUED)

Well number	Date of collection	Temperature (°C)	Silica (SiO_2)	Total iron (Fe) (µg/l)	Total manganese (Mn) (µg/l)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3), as N	Orthophosphate (PO_4) as P	Dissolved solids (residue on evaporation at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos per cm^2 at 25°C)	Field pH
																	Calcium, magnesium	Noncarbonate		
									Wells in Hershey Formation											
Be- 94	12-14-71	---	9.7	90	10	80	16	5.9	.4	244	64	8.4	.0	.36	.00	303	266	66	485	7.3
738	12-14-71	---	7.8	20	0	108	8.9	5.0	.6	284	50	7.8	.1	3.6	.00	350	306	74	536	6.9
778	12-16-71	---	8.1	10	20	79	18	17	2.9	255	73	19	.0	4.5	.52	378	271	62	601	7.5
									Wells in Myerstown Formation											
Be- 689	12-15-71	---	8.9	20	0	125	9.3	4.9	2.4	335	53	19	.1	2.3	.00	391	350	76	638	7.2
750	12-15-71	---	11	60	10	80	18	7.5	.4	272	39	7.3	.3	.09	.00	272	274	51	460	7.4
772	12-16-71	---	10	10	0	74	26	9.5	.9	278	60	18	.2	3.2	.02	370	292	64	589	7.3
1091	12-15-71	---	11	30	30	114	24	7.8	1.4	259	91	23	.1	8.4	.00	---	383	171	587	7.2
									Wells in Annville Formation											
Be- 743	12-14-71	---	8.5	40	10	131	16	24	3.6	351	51	47	.1	4.7	.02	448	393	106	722	6.7
747	12-14-71	---	5.7	20	10	70	7.0	100	2.7	297	46	76	.1	6.3	.00	470	204	0	747	6.8
									Wells in Ontelaunee Formation											
Be- 207	12-16-71	13	9.2	20	0	70	21	11	28	221	44	19	.0	7.2	.00	289	261	80	516	7.0
475	12-14-71	11	11	50	30	65	8.7	4.1	.5	165	59	5.3	.0	.00	.00	237	198	63	382	7.7
787	12-16-71	---	11	10	10	73	35	5.1	1.4	314	57	20	.5	1.5	.00	367	326	69	614	7.1
833	12-17-71	---	7.4	130	10	77	25	2.5	.8	297	26	8.3	.0	5.4	.00	321	295	52	530	7.2
1068	12-17-71	---	8.3	30	10	97	13	7.7	1.6	249	71	17	.1	.84	.00	341	296	92	534	7.2

Wells in Epler Formation

Be- 755	12-15-71	---	9.2	20	10	101	12	5.9	2.5	235	33	20	.0	13	.00	311	301	109	574	7.4
756	12-14-71	---	9.0	480	10	101	26	9.5	5.0	370	38	20	.1	8.6	.00	423	359	56	710	7.1
789	12-16-71	---	8.7	20	0	52	20	3.5	2.2	205	36	8.9	.0	1.5	.01	240	212	44	410	7.2
830	12-17-71	---	6.3	0	10	79	34	10	1.1	342	25	4.7	.0	.09	.00	274	337	57	552	7.2
1060	12-20-71	---	5.8	430	10	60	20	4.5	9.6	234	30	14	.0	5.8	.00	298	232	40	476	7.2

Well in Stonehenge Formation

8e- 836	12-17-71	---	8.7	10	0	71	35	4.7	9.4	351	25	14	.0	9.3	.00	377	321	33	645	6.9

Wells in Richland Formation

8e- 124	12-15-70	12.5	11	40	10	102	27	25	3.8	312	75	34	.3	6.3	.01	441	365	110	725	8.0
128	4-22-49	---	8.5	500	---	86	23	7.5	2.2	301	59	14	.1	2.5	---	392	309	62	625	---
188	12-16-71	---	20	10	0	23	8.3	5.5	1.9	108	17	4.1	.2	.00	.02	131	92	3	206	7.9
345	12-15-70	13.0	10	60	20	87	25	34	4.0	290	67	38	.8	11	.04	462	320	82	724	7.1
762	12-14-71	---	6.9	300	60	120	18	11	10	287	100	14	.2	7.7	.00	434	374	139	645	7.5
806	12-16-71	---	18	30	0	38	25	5.2	.5	234	32	5.0	.0	3.2	.05	263	198	7	439	7.4

Wells in Millbach Formation

8e- 434	6-30-71	---	11	0	0	55	23	24	5.4	180	59	35	.2	7.5	.00	397	232	84	588	7.3
606	12-16-71	---	18	0	0	45	17	3.4	2.7	190	17	8.4	.1	3.6	.00	211	183	27	356	7.0

Well in Snitz Creek Formation

Be- 759	12-14-71	---	8.7	50	30	25	11	.8	2.7	128	.4	1.8	.1	.68	.04	114	108	3	210	7.6

Wells in Allentown Formation, Maiden Creek Member

8e- 405	4-16-71	---	12	110	80	90	22	14	3.9	251	7.1	46	.4	3.2	.01	459	315	110	673	6.7
825	4-16-71	13	12	20	6	66	22	16	5.4	220	60	27	.4	2.2	.02	348	255	75	532	7.3
1016	12-20-71	---	9.0	20	50	104	18	2.4	1.9	308	41	10	.0	11	.00	356	334	81	606	7.1

Wells in Allentown Formation, Muhlenberg Member

Be- 855	12-17-71	---	10	310	10	65	38	49	4.9	279	22	93	.0	9.3	.00	483	319	90	755	7.1
1004	12-20-71	---	7.0	10	0	51	26	26	4.1	217	32	8.6	.1	5.7	.01	255	235	57	447	7.4
1029	12-20-71	---	13	20	10	47	13	3.8	4.3	197	9.7	4.3	.0	1.4	.01	186	171	10	330	7.3

TABLE 11. (CONTINUED)

Well number	Date of collection	Temperature (°C)	Silica (SiO_2)	Total iron (Fe) ($\mu g/l$)	Total manganese (Mn) ($\mu g/l$)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3), as N	Orthophosphate (PO_4) as P	Dissolved solids (residue on evaporation at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos per cm^2 at 25°C)	Field pH
																	Calcium, magnesium	Noncarbonate		
Wells in Allentown Formation, Tuckerton Member																				
Be- 533	9-03-68	---	---	0	0	38	22	18	13	166	33	13	--	15	.03	---	186	56	422	7.3
533	1-10-72	---	9:2	270	10	40	25	8.5	8.0	152	39	16	.3	10	.00	290	203	79	436	---
536	9-03-68	14	---	6500	550	43	16	9.3	1.0	168	44	6.5	--	.32	.00	227	174	39	365	7.1
544	9-03-68	14	---	0	0	42	28	15	27	255	59	9.5	--	5.0	.00	310	220	29	551	7.3
544	2-25-72	---	8.5	40	10	48	28	7.0	15	234	55	10	.2	2.1	.00	293	235	43	461	---
Wells in Leithsville Formation																				
Be- 416	4-06-65	11	9.2	50	0	28	17	1.8	1.7	166	6.5	2.7	.1	1.0	.00	142	140	4	275	8.0
619	10-26-71	11.5	19	420	10	30	15	2.2	3.2	170	.4	1.7	.2	.09	.03	166	137	0	266	7.8
901	12-17-71	---	9.4	120	50	21	9.3	1.6	2.4	114	5.7	1.7	.3	.04	.00	112	91	0	202	7.5
1032	10-18-71	---	13	880	10	27	14	1.5	2.8	150	.4	1.2	.4	.52	.00	141	125	2	244	7.7
1095	12-17-71	---	9.6	0	0	33	16	2.7	1.4	161	.6	5.0	.0	1.9	.01	140	149	17	269	7.6
1098	12-20-71	---	9.2	20	10	30	17	3.9	2.4	161	3.9	6.5	.1	3.2	.02	163	145	13	299	7.6
Wells in Lower and Middle Ordovician carbonate rocks, undifferentiated																				
Be- 435	7-08-71	15	12	50	10	76	44	30	7.4	296	76	47	.6	17	.01	555	371	128	828	---
800	7-01-71	---	13	140	10	84	38	20	8.0	293	134	25	.3	7.7	.01	523	366	126	774	7.7

TABLE 12. CHEMICAL ANALYSES OF WATER FROM SPRINGS IN BERKS COUNTY

Spring number	Date of collection	Temperature (°C)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na) + potassium (K), as Na	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3), as Na	Orthophosphate (PO_4), as P	Hardness, as $CaCO_3$		Specific conductance (micromhos at 25°C)	Field pH	Fecal coliforms (no/100 ml)	Dissolved oxygen (D.O.)	D.O. saturation (percent)	Total organic carbon (TOC)
											Calcium, magnesium	Noncarbonate						
Be-Sp-6	11-10-71	11.0	25	14	2.5	141	7.9	1.3	<1	0.05	120	5	247	7.8	0	9.3	84	2.5
7	11- 9-71	11.0	62	25	71	233	139	24	12	.03	258	67	769	8.2	14	7.0	63	3.5
10	11-10-71	11.0	56	15	8.3	168	55	9.5	2.9	.02	201	64	430	7.4	134	7.1	64	2.5
12	11-10-71	11.0	64	19	5.8	219	30	11	6.8	.05	238	58	477	7.7	8	7.3	66	3.0
15	11- 8-71	11.0	70	24	6.7	242	38	12	9.0	.01	273	75	528	6.2	2	8.2	74	3.0
16	11- 8-71	10.5	71	19	9.9	232	47	11	6.1	.02	255	65	521	6.4	29	7.9	71	4.5

TABLE 13. MEDIAN CONCENTRATIONS OF CHEMICAL CONSTITUENTS IN GROUNDWATER

	Median of indicated constituent, in milligrams per liter, except as indicated			
Constituents	Hamburg sequence	Allentown Formation	Leithsville Formation	All carbonate rocks except Allentown and Leithsville Formations
Silica (SiO_2)	13	9.6	9.5	9.2
Total iron (Fe), in µg/l	70	40	85	30
Total manganese (Mn), in µg/l	10	10	10	10
Calcium (Ca)	30	51	29	80
Magnesium (Mg)	6.6	22	16	20
Sodium (Na)	5.7	9.3	2.0	7.8
Potassium (K)	.9	4.3	2.4	2.5
Bicarbonate (HCO_3)	98	220	161	272
Sulfate (SO_4)	20	39	2.2	58
Chloride (Cl)	5.2	10	2.2	18
Fluoride (F)	.0	.2	.2	.1
Nitrate (NO_3), as N	4.2	3.2	.76	3.6
Orthophosphate (PO_4), as P	.00	.00	.01	.00
Dissolved solids (residue at 180°C)	154	293	142	374
Calcium, magnesium hardness as $CaCO_3$	102	235	138	304
Noncarbonate hardness as $CaCO_3$	24	75	3	72
Specific conductance, (micromhos per cm^2 at 25°C)	243	461	268	588
pH Laboratory	7.6	7.8	7.7	7.6
Field	7.0	7.3	7.6	7.2
Number of analyses used	12 to 24	8 to 9	6	36 to 38

TABLE 14. RECORD OF WELLS

Well location: The number is that assigned to identify the well. It is prefixed by a two-letter abbreviation of the county. The lat-long is the coordinates in degrees and minutes of the southeast corner of a 1-minute quadrangle within which the well is located.

Use: A, air conditioning; C, commercial; F, fire; H, domestic; I, irrigation; N, industrial; P, public supply; R, recreation; S, stock; T, institution; U, unused.

Topographic setting: H, hilltop; S, hillside; V, valley.

Aquifer: TR, Triassic rocks, undifferentiated; Srt, Rose Hill and Tuscarora Formations, undifferentiated; Omp, Martinsburg Formation, Pen Argyl Member; Omr, Martinsburg Formation, Ramseyburg Member; Omb, Martinsburg Formation, Bushkill Member; Osh, Shochary Sandstone of Willard and Cleaves, 1939; Ou, unnamed shale; Oh8, Hamburg sequence, lithotectonic unit 8; Oh7, Hamburg sequence, lithotectonic unit 7; Oh6, Hamburg sequence, lithotectonic unit 6; Oh5, Hamburg sequence, lithotectonic unit 5; Oh4, Hamburg sequence, lithotectonic unit 4; Oh3, Hamburg sequence, lithotectonic unit 3; Oh2, Hamburg sequence, lithotectonic unit 2; Oh2A, Hamburg sequence, lithotectonic unit 2A; Oh1, Hamburg sequence, lithotectonic unit 1; Oj, Jacksonburg Formation; Ohy, Hershey Formation; Omy, Myerstown Formation; Oa, Annville Formation; Oo, Ontelaunee Formation; Oe, Epler Formation; Or, Rickenbach Formation; Os, Stonehenge Formation; Єamc, Allentown Formation, Maiden Creek Member; Єam, Allentown Formation, Muhlenberg Member; Єat, Allentown Formation, Tuckerton Member; Єr, Richland Formation, Єm, Millbach Formation, Єsc, Snitz Creek Formation; Єbs, Buffalo Springs Formation; Єlc, Middle and Lower Cambrian carbonate rocks, undifferentiated, of Northern Conestoga Valley affinities; Єlv, Leithsville Formation; Єah, Antietam/Harpers Formation; Єha, Hardyston Formation; gn, granite gneiss and granite.

Lithology: arls, argillaceous limestone; dol, dolomite; ls, limestone; meta, metamorphic--quartzite or gneiss; sh, shale; ss, sandstone.

Static water level: Depth--F, flowing; +, above land surface; date measured, month/last two digits of year.

Reported yield: gpm, gallons per minute.

Specific capacity: gpm/ft, gallons per minute per foot of drawdown.

Hardness: gpg, grains per gallon.

Specific conductance: Deg C, degrees Celsius.

TABLE 14.

Well Location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Be- 2	4032-7532	Howard DuBois	---	---	U	356	S	Oh1/---
8	4018-7558	American Bank & Trust Co.	---	---	U	360	S	€bs/ls
10	4019-7558	Henry Weldy	---	---	U	460	H	Oo/dol
11	4020-7557	Glen-Gery Corp.	---	---	N	300	S	Oo/dol
30	4020-7606	Benjamin Imes	---	---	C	395	V	Omy/ls
44	4019-7602	Green Valley Country Club	---	---	R	302	V	Oo/dol
54	4031-7546	Kutztown Bor.	M. B. Biery	---	U	410	V	Oj/arls
57	4030-7545	do.	---	---	P	410	V	Oe/ls
62	4020-7556	Crompton & Knowles Corp.	Ridpath and Potter Co.	1910	U	260	V	€r/dol
64	4020-7555	Moss Realty Co., Inc.	---	---	U	268	S	€r/dol
65	4019-7555	Ludens, Inc.	---	---	U	280	S	€lc/dol
66	4020-7555	Reading Cold Storage Co.	---	---	N	258	S	€m/ls
67	4019-7555	Sun Oil Co.	---	---	U	260	S	€lc/dol
68	4019-7556	Hopper Paper Co.	---	---	U	200	V	€bs/ls
69	4019-7556	do.	---	---	U	200	V	€bs/ls
70	4019-7555	do.	---	---	U	200	V	€bs/ls
71	4020-7555	Gus Yatron	---	---	U	300	S	€lc/dol
72	4018-7558	Berks Box Co.	---	1925	U	355	S	€bs/ls
79	4020-7552	Mount Penn Bor. Mun. Auth.	---	1910	U	362	V	€lv/dol
80	4029-7541	Topton Lutheran Home	---	---	U	550	S	€lv/dol
83	4029-7613	Jacob Sholl	Kermit S. Snyder	1955	H	570	V	Oh1/---
84	4019-7602	Aluminum Alloys, Inc.	Elmer C. Lenhart	1960	N	325	V	€r/dol
85	4022-7555	Leonard Mayernik	Richard H. Stanley	1954	U	300	V	Camc/dol
90	4025-7602	Paul Dietrich	do.	1953	H	382	S	Oh7/sh
91	4019-7600	Allen Diller	do.	1954	U	390	S	€r/dol
93	4023-7615	Dallas Flory	Kohl Bros., Inc.	---	H	460	S	Ohy/arls
94	4023-7615	Miles Layser	do.	---	H	520	S	Ohy/arls
95	4024-7516	W. W. Hoover	---	1918	H	555	S	Ohy/arls
124	4019-7600	Hofmann Industries, Inc.	Kohl Bros., Inc.	1960	N	350	V	€r/dol
128	4018-7558	Thun Investment Corp.	---	---	U	310	V	€r/dol
129	4026-7607	Emerson Stoudt	---	1946	H	346	S	Oh2/sh
130	4029-7614	Humble Oil and Refining Co.	---	---	C	580	H	Oh1/sh
133	4018-7559	Earl Nyman	Richard H. Stanley	1954	H	360	S	Omb/sh
135	4019-7602	Foscone's Golf Center	do.	1955	U	370	S	€r/dol
137	4029-7557	Wolfe Dye & Bleach Works, Inc.	---	---	N	340	S	Oh2A/sh
138	4017-7559	Clarence Haushouer	Richard H. Stanley	1954	U	415	V	€bs/ls
147	4018-7557	Anthony Varrichone	do.	1953	U	280	V	€bs/ls
153	4017-7558	E. R. Ruth	do.	1954	U	450	S	€lc/dol
157	4024-7555	Muhlenberg Swimming Assoc.	Kohl Bros., Inc.	1951	U	320	V	€am/dol
158	4024-7555	do.	do.	1950	U	320	V	€am/dol
161	4029-7557	Wolfe Dye & Bleach Works, Inc.	do.	---	N	350	S	Oh2A/sh
162	4029-7557	do.	do.	1954	U	330	V	Oh2A/sh
163	4029-7557	do.	do.	1949	U	340	V	Oh2A/sh
164	4029-7557	do.	do.	1963	N	360	S	Oh2A/sh
165	4025-7601	Ziegler's Nurseries	---	1958	I	510	S	Oh1/sh
168	4022-7553	Muhlenberg Twp. Auth.	Kohl Bros., Inc.	1955	P	660	S	€ha/meta
169	4023-7554	do.	---	1909	P	490	S	€ha/meta
170	4023-7554	do.	Kohl Bros., Inc.	1938	P	502	S	Oh6/sh
171	4023-7555	do.	do.	1943	P	370	S	€amc/dol
172	4023-7555	do.	do.	1950	P	378	S	€amc/dol
173	4022-7555	do.	do.	---	P	293	V	€amc/dol
174	4022-7555	do.	do.	1951	P	302	V	€amc/dol
175	4022-7555	do.	do.	1961	P	303	V	€am/dol
176	4052-7555	do.	do.	1963	P	300	V	€am/dol
177	4023-7555	Donald Long	---	1942	U	358	S	€amc/dol
178	4023-7555	do.	---	1942	U	365	S	€amc/dol
180	4025-7606	Bernville Water Co.	Samuel N. Snyder	1946	P	340	V	Oh3/sh
181	4026-7606	do.	Kermit S. Snyder	1957	P	440	H	Oh3/sh
182	4037-7558	Hawk Mountain Sanctuary	do.	1959	H	1160	S	Omp/sh
183	4038-7558	do.	---	1959	U	1295	S	Omp/sh
187	4019-7605	Wernersville Mun. Auth.	Kohl Bros., Inc.	1962	P	460	V	€r/dol
188	4019-7605	do.	---	---	P	460	V	€r/dol
189	4026-7558	Leesport Bor.	Samuel N. Snyder	1927	P	485	H	Oh4/sh
190	4026-7558	do.	Kermit S. Snyder	1954	P	462	H	Oh4/sh
191	4018-7602	Citizens Utilities Water Co. of Pa.	---	1930	U	370	V	€r/dol
192	4018-7602	do.	---	1931	P	370	V	€r/dol
193	4018-7602	do.	---	1934	U	362	V	€r/dol

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
10	---	48	---	7	10/47	---	---	---	---	---	Be- 2
70	---	6	---	48	4/71	60	---	---	---	---	8
180	---	6	---	60	---	60	---	---	---	---	10
476	---	---	---	---	---	---	---	10	600	7.8	11
85	---	6	---	30	---	20	---	16	935	8.1	30
300	---	6	---	6	---	150	---	---	---	---	44
800	---	6	90	---	---	8	---	---	---	---	54
50	---	12	---	7	---	1000	77	---	---	---	57
245	185	8	---	55	---	400	100	---	---	---	62
300	---	8	---	72	6/71	300	---	---	---	---	64
800	---	8	---	---	---	0	---	---	---	---	65
250	---	10	---	72	6/71	225	---	---	---	---	66
300	---	6	---	30	---	90	---	---	---	---	67
600	---	6	---	---	---	60	---	---	---	---	68
400	---	---	---	---	----	60	---	---	---	---	69
200	---	---	---	---	---	60	---	---	---	---	70
160	---	6	---	---	---	30	---	---	---	---	71
560	---	6	---	---	---	0	---	---	---	---	72
303	84	8	---	30	---	221	5.5	---	---	---	79
250	200	8	---	170	---	100	---	---	---	---	80
87	35	6	---	8	5/55	53	---	8	380	7.6	83
130	---	6	---	6	3/72	---	---	---	---	---	84
123	34	6	---	75	5/71	7	---	---	---	---	85
125	43	6	---	10	8/53	10	.22	3	160	---	90
200	---	6	---	18	4/71	2	---	---	---	---	91
100	---	6	---	39	8/57	---	---	14	640	7.5	93
125	---	6	---	7	6/69	---	---	14	580	7.5	94
58	---	---	---	35	---	---	---	9	345	7.5	95
548	28	8	62;148;200;240;540	28	4/60	400	9.1	18	830	8.0	124
132	---	6	---	22	3/72	25	---	---	---	---	128
80	30	6	---	---	---	25	---	---	---	---	129
---	---	6	---	---	---	---	---	---	---	---	130
170	58	6	87;165	60	9/54	14	1.4	---	---	---	133
155	95	6	---	65	5/55	10	---	---	---	---	135
---	---	---	---	---	---	---	---	---	---	---	137
176	144	6	---	65	11/54	---	---	---	---	---	138
67	50	6	---	35	5/53	15	15	---	---	---	147
91	57	6	---	65	4/71	---	---	---	---	---	153
801	6	8	---	46	---	0	---	---	---	---	157
710	---	---	---	---	---	30	---	---	---	---	158
300	---	6	---	---	---	30	---	---	---	---	161
600	23	8	---	11	3/54	75	---	---	---	---	162
551	15	8	---	0	3/49	90	.60	---	---	---	163
220	43	6	55;110;167	60	6/63	260	4.3	---	---	---	164
160	20	8	---	14	5/64	75	---	---	---	---	165
450	225	6	225;323	50	8/55	150	1.2	1	62	---	168
702	---	8	---	112	---	100	---	12	390	7.6	169
670	70	8	---	86	1964	105	---	6	320	---	170
757	125	8	---	105	1942	200	2.9	9	480	---	171
438	252	6	---	112	---	400	12	---	---	---	172
300	105	8	---	40	4/51	240	1.8	7	380	7.5	173
300	61	12	56;179;240	54	7/51	470	15	9	480	7.5	174
540	135	8	162;181;536	75	4/61	500	20	11	610	7.2	175
449	52	12	82;283;400;447	74	2/64	525	11	14	720	7.7	176
240	---	12	---	---	---	250	---	---	---	---	177
260	---	12	---	---	---	250	---	---	---	---	178
350	45	8	---	13	9/71	100	---	---	---	---	180
224	32	6	---	45	9/57	50	---	---	---	---	181
145	102	6	---	90	1959	11	---	---	---	---	182
138	98	6	---	---	---	22	---	---	---	---	183
470	51	8	---	52	3/62	120	1.4	---	---	---	187
291	163	8	---	53	---	365	41	4	260	7.9	188
392	---	8	---	---	---	50	---	5	325	---	189
525	49	8	---	88	1954	60	.27	4	240	---	190
---	---	---	---	---	---	250	---	---	---	---	191
233	20	8	---	---	---	280	---	---	---	---	192
---	---	8	---	2	8/70	---	---	---	---	---	193

TABLE 14.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Be-194	4018-7601	Citizens Utilities Water Co. of Pa.	---	1936	U	578	S	€r/dol
195	4018-7601	do.	---	1936	U	477	S	€m/ls
196	4018-7601	do.	---	1936	U	578	S	€r/dol
197	4018-7601	do.	---	1936	U	563	S	€r/dol
198	4018-7601	do.	---	1936	U	548	S	€r/dol
199	4018-7601	do.	---	1937	U	628	S	€r/dol
200	4018-7601	do.	---	1937	U	629	S	€r/dol
201	4018-7601	do.	---	1938	P	655	S	€r/dol
202	4018-7601	do.	Kohl Bros., Inc.	1941	P	659	S	€r/dol
203	4018-7618	do.	do.	1956	P	637	S	€r/dol
204	4018-7601	do.	do.	1959	U	428	S	€m/ls
205	4021-7559	E. G. Hartman	do.	1958	U	320	S	Oe/ls
206	4018-7601	Citizens Utilities Water Co. of Pa.	do.	1960	P	428	S	€m/ls
207	4020-7601	do.	do.	1961	P	298	V	Oo/dol
208	4019-7601	do.	do.	1963	U	355	V	€r/dol
209	4035-7556	Hamburg Bor.	---	---	U	728	V	Oh1/---
210	4034-7556	do.	---	---	P	720	V	Oh1/---
211	4034-7556	do.	---	1930	P	716	V	Oh1/---
212	4035-7556	do.	Clarence F. Wink	1943	P	730	V	Oh1/---
213	4034-7559	do.	Kohl Bros., Inc.	1945	P	560	S	Oh1/sh
214	4030-7557	Shoemakersville Bor.	do.	1934	P	382	H	Oh4/sh
215	4030-7557	do.	do.	1936	U	386	H	Oh4/sh
216	4030-7557	do.	do.	1946	P	340	V	Oh4/sh
217	4030-7558	do.	Kermit S. Snyder	1956	P	360	V	Oh4/sh
218	4020-7552	Mount Penn Bor. Mun. Auth.	---	---	P	362	V	€lv/dol
219	4020-7552	do.	C. S. Garber & Sons, Inc.	1951	P	350	V	€lv/dol
220	4021-7557	John Schell	---	1912	I	285	S	€amc/dol
225	4020-7557	North American Rockwell Corp.	---	---	U	280	V	€r/dol
227	4028-7544	Flint Hill Water Co.	---	1957	P	527	S	€ha/meta
241	4030-7545	Kutztown Bor.	---	1929	P	410	V	Oe/ls
242	4030-7545	do.	Kohl Bros., Inc.	1964	P	403	V	Oe/ls
245	4024-7601	Lincoln's Restaurant	---	1934	C	490	H	Oh6/sh
246	4030-7510	William Grimes	---	1948	S	562	S	Oh1/sh
247	4029-7610	George M. Anthony & Sons	---	1915	C	570	S	Oh1/---
248	4029-7610	Post Precision Castings, Inc.	Kermit S. Snyder	1947	N	570	S	Oh1/sh
249	4029-7611	do.	Joseph Epley	1914	N	570	S	Oh1/---
250	4028-7545	Lyons Water Co.	---	1912	P	550	S	€lv/dol
251	4028-7545	do.	C. S. Garber & Sons, Inc.	1963	P	550	S	€ha/meta
252	4026-7557	Leesport Bor.	Kermit S. Snyder	1962	R	285	V	Oo/dol
253	4019-7551	St. Lawrence Bor.	---	1909	U	500	S	€ha/meta
254	4019-7551	do.	Kohl Bros., Inc.	---	U	510	S	€ha/meta
255	4019-7551	do.	Edward M. Arnold, Sr.	1964	U	540	S	€ha/meta
258	4025-7505	Lee Katz	Kohl Bros., Inc.	1962	H	467	S	Oh2/ls
259	4037-7551	Albany Twp. Sch. Dist.	do.	1957	T	422	V	Oh2A/sh
260	4031-7550	Leon Adams	do.	1961	U	590	H	Oh4/ls
261	4029-7550	Moselem Springs Golf Club	do.	1963	C	365	S	Oe/ls
263	4027-7548	Red Cheek, Inc.	do.	1957	U	437	V	€at/dol
266	4022-7558	Reading Airport	do.	1959	U	330	H	€amc/dol
267	4022-7557	do.	do.	1960	U	355	H	€amc/dol
268	4023-7600	Harvey Haupt	do.	1962	C	310	S	Oh6/sh
269	4025-7554	Michele Morganti & Sons	do.	1959	I	365	S	€lv/dol
270	4025-7554	Raymond Gaspari	do.	1959	I	367	S	€lv/dol
271	4028-7557	Kenneth Adams	do.	1962	H	530	H	Oh4/sh
272	4025-7554	Joseph Camilli	do.	1959	I	340	S	€at/dol
273	4025-7554	Romanio Camilli	do.	1958	I	340	S	€at/dol
274	4026-7554	Ascoli Realty Corp.	do.	1962	I	360	S	€at/dol
275	4024-7554	Angelo Pellegrini	do.	1960	I	480	S	€ha/meta
276	4024-7554	Daniel Pacifico	do.	1961	I	450	S	€lv/meta
277	4025-7554	Ontelaunee Farms, Inc.	do.	1962	N	508	S	€lv/meta
278	4024-7554	Elvira Giorgi	do.	1960	U	397	V	€lv/dol

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
200	---	---	---	---	---	80	---	---	---	---	Be-194
300	---	12	---	---	---	---	---	---	---	---	195
500	---	---	---	---	---	---	---	---	---	---	196
254	---	6	---	73	5/55	---	---	---	---	---	197
500	---	---	---	---	---	50	---	---	---	---	198
327	59	12	---	122	5/37	100	---	---	---	---	199
250	60	12	---	102	5/37	200	---	---	---	---	200
305	58	10	---	154	---	350	55	5	185	---	201
308	71	10	---	160	---	400	10	---	---	---	202
500	214	8	---	137	12/70	500	125	6	230	---	203
410	46	10	112;290;360;402	58	3/59	300	2.0	---	---	---	204
325	---	8	150	73	12/70	100	8.9	13	450	---	205
447	65	10	110;175;325	56	3/72	600	7.5	---	---	---	206
360	28	8	37;155;340	12	4/71	400	14	14	600	7.0	207
358	43	8	58;322;325;328	34	3/63	400	200	---	---	---	208
302	---	8	---	---	---	---	---	---	---	---	209
224	---	8	---	76	---	80	1.9	---	---	---	210
303	---	8	---	16	6/44	200	7.7	2	135	6.7	211
355	80	8	---	35	7/42	200	2.1	---	---	---	212
300	50	10	---	10	11/71	278	5.2	2	120	6.8	213
320	---	8	---	37	8/71	60	.24	2	285	---	214
500	---	8	---	35	1946	120	1.5	---	---	---	215
417	73	8	---	20	8/46	150	1.2	8	---	6.7	216
350	180	8	---	10	9/56	120	3.0	2	250	7.4	217
334	57	8	---	0	---	170	6.8	8	---	---	218
276	46	10	---	4	5/51	357	4.7	---	---	---	219
410	---	8	---	71	3/72	100	100	---	---	---	220
407	185	13	---	73	---	470	14	---	---	---	225
82	72	8	---	14	10/71	---	---	---	---	---	227
31	---	12	---	---	---	1000	1000	10	520	7.8	241
200	36	6	49;112	1	10/71	550	225	13	---	---	242
78	---	6	---	---	---	9	---	---	165	---	245
160	---	6	---	---	---	---	---	10	520	---	246
155	---	6	---	---	---	30	---	---	---	---	247
315	---	8	---	6	---	160	---	---	---	---	248
99	---	6	---	6	---	---	---	12	810	7.4	249
713	---	8	---	120	---	45	.58	6	350	7.7	250
180	142	6	---	115	10/71	95	1.7	9	325	---	251
247	28	6	---	23	1962	35	.35	---	---	---	252
90	---	---	---	---	---	31	---	---	---	---	253
195	122	6	100;174	80	---	10	.10	0	25	---	254
125	96	6	---	16	7/64	51	.57	1	66	---	255
295	57	6	97;172;216;244;278;292	85	9/62	20	.17	---	---	---	258
150	52	6	34;78;148	---	---	27	---	4	290	7.8	259
235	29	6	72;187	45	1/61	3	.05	---	---	---	260
220	32	6	128;170;210	45	6/63	200	4.4	11	555	---	261
120	70	6	85;115	30	---	300	---	---	---	---	263
503	203	6	215;330	90	1959	80	.84	---	---	---	266
529	---	---	69;119;216;255	70	4/60	30	.23	---	---	---	267
323	45	6	55;260	20	3/62	25	.14	7	380	8.0	268
355	65	6	93;108;127;205;354	85	9/59	60	2.4	---	---	---	269
295	83	6	115;123;135;295	70	11/59	55	1.0	---	---	---	270
175	61	6	---	63	1/62	20	.21	1	100	---	271
170	139	4	73;90;112;150;170	45	9/59	20	1.3	---	---	---	272
157	95	6	50;75;155	43	8/71	55	.76	---	---	---	273
220	59	6	71;140;200	60	7/62	75	1.2	---	---	---	274
210	---	6	---	F	9/60	40	.62	---	---	---	275
485	324	6	402;475	67	8/64	10	.19	---	---	---	276
400	195	6	130;245;350	105	3/62	180	1.2	---	---	---	277
355	242	4	---	106	6/71	15	.37	---	---	---	278

TABLE 14.

Well location								
Number	Lat-Long	Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Be-280	4025-7554	Ontelaunee Farms, Inc.	Kohl Bros., Inc.	1958	N	500	S	€ha/meta
281	4025-7554	do.	do.	1959	N	520	S	€ha/meta
282	4024-7555	Henry Gaspari	do.	1964	I	400	S	€am/dol
283	4024-7554	Quirino DiMarco	do.	1960	I	426	S	€ha/meta
284	4020-7602	Anna Mogel	do.	1960	H	420	S	Oh8/sh
285	4024-7555	Kawecki Berylco Ind., Inc.	---	---	U	324	S	€at/dol
286	4024-7554	Gaetani Bros.	Kohl Bros., Inc.	1960	U	523	S	€ha/meta
287	4026-7554	Ascoli Realty Corp.	do.	1956	U	345	S	€at/dol
288	4023-7554	Rosdale Realty Corp.	do.	1958	U	418	S	Oh6/---
289	4023-7554	Western Electric Co.	do.	1960	U	380	S	€amc/dol
290	4023-7554	do.	do.	1957	U	377	S	Oh6/sh
291	4023-7554	do.	do.	1957	U	374	S	€amc/dol
292	4023-7556	Muhlenberg Twp. Auth.	do.	1960	U	283	V	€at/dol
293	4023-7556	do.	do.	1960	U	280	V	€at/dol
294	4021-7555	Polymer Corp.	do.	1958	U	280	S	€amc/dol
295	4020-7557	Wyomissing Corp.	do.	1957	U	300	H	€r/dol
296	4020-7555	Pomeroy's Inc.	do.	1961	A	260	S	€m/ls
297	4021-7556	Carpenter Technology Corp.	do.	1958	U	210	V	€amc/dol
298	4021-7556	do.	do.	1958	U	250	V	€amc/dol
299	4021-7556	do.	do.	1957	U	277	V	€amc/dol
300	4021-7556	do.	do.	1957	U	238	V	€amc/dol
302	4019-7556	Interstate Container Corp.	do.	1946	U	240	H	€bs/ls
303	4019-7556	do.	do.	1947	U	240	H	€bs/ls
304	4019-7556	do.	do.	1947	N	240	H	€bs/ls
306	4020-7555	Reading Redevelopment Auth.	do.	1941	U	283	S	€lc/dol
307	4021-7556	Dana Corp.	do.	1950	U	280	S	€amc/dol
309	4019-7552	Robert Quinter	do.	1959	U	385	S	€lc/dol
312	4019-7552	Exeter Twp. Sch.	do.	1963	T	340	S	€lc/dol
313	4019-7552	St. Lawrence Carbonizing Co., Inc.	do.	1963	N	278	V	€lc/dol
314	4019-7552	do.	do.	1963	N	278	V	€lc/dol
315	4019-7552	do.	do.	1963	N	278	V	€lc/dol
322	4026-7554	DiGiorgio Mushroom Corp.	do.	1960	N	362	S	€at/dol
323	4027-7553	John J. Biscanti, Inc.	do.	1963	I	380	H	Oj/arls
324	4029-7605	Samuel Schaeffer	Clarence F. Wink	1970	H	600	H	Ohl/---
325	4029-7557	Brush Beryllium Co.	Kohl Bros., Inc.	1960	N	365	S	Ohl/---
326	4029-7557	do.	do.	1962	U	370	S	Ohl/sh
327	4019-7604	Earl Fehl	do.	1959	U	398	S	Omy/ls
328	4033-7601	Blue Mountain Acad.	do.	1958	H	550	H	Ohl/sh
329	4031-7606	Continental Traveler, Inc.	Clarence F. Wink	1971	N	610	S	Ohl/---
330	4019-7602	Green Valley Country Club	Kohl Bros., Inc.	1963	C	347	S	Oo/dol
331	4020-7602	E. L. Angstadt	do.	1962	H	362	S	Oo/dol
334	4022-7607	George Schmick	do.	1958	H	525	H	Oh4/---
335	4020-7607	Caron Spinning Co.	do.	1959	U	424	V	€r/dol
336	4020-7607	do.	do.	1960	U	420	V	Oe/ls
337	4020-7607	do.	do.	1961	U	417	V	€r/dol
338	4020-7607	do.	do.	1961	U	418	V	€r/dol
339	4020-7607	do.	do.	1961	U	422	V	€r/dol
340	4020-7607	do.	do.	1960	U	422	V	€r/dol
341	4020-7607	do.	do.	1961	U	424	V	€r/dol
342	4019-7601	Donald Robitzer	do.	1964	I	333	S	Oo/dol
344	4019-7601	Hofmann Industries, Inc.	do.	1961	U	340	V	€r/dol
345	4019-7601	do.	do.	1961	N	340	V	€r/dol
346	4019-7600	do.	do.	1960	U	340	V	€r/dol
347	4019-7601	Cacoosing Industries, Inc.	do.	1957	U	348	S	€r/dol
348	4018-7601	Citizens Utilities Water Co. of Pa.	do.	1957	U	640	S	€r/dol
349	4018-7601	do.	do.	1958	U	710	H	€ha/meta

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
600	187	4	158;326;592	185	10/58	25	.33	---	---	---	8e-280
590	262	8	335;390;580	129	6/59	60	.50	5	240	7.1	281
230	140	4	158;220	115	6/71	25	.71	10	500	7.7	282
425	103	6	---	110	1960	5	.04	---	---	---	283
95	40	6	50;78	20	8/70	20	.29	7	345	---	284
---	148	6	---	18	7/59	---	---	---	---	---	285
279	186	4	160;180;260	125	9/60	6	.17	---	---	---	286
272	206	4	---	205	11/56	20	1.3	---	---	---	287
427	427	8	176;220;415	135	8/58	220	1.9	4	---	---	288
406	280	6	204;330	---	---	250	---	---	---	---	289
112	60	12	108	90	5/57	180	45	---	---	---	290
100	72	10	86;97	76	7/57	180	16	---	---	---	291
500	---	---	114;205;289	---	---	60	---	---	---	---	292
226	40	8	42;45;57; 89;109;113; 148;189	39	4/71	503	93	8	720	6.6	293
57	25	6	49;55	37	4/71	100	100	---	---	---	294
182	14	12	103;168	30	---	---	---	---	---	---	295
650	69	12	170;620	43	5/61	110	.64	---	---	---	296
167	25	8	162;167	10	11/58	500	---	---	---	---	297
65	67	8	65	62	11/58	400	400	---	---	---	298
109	98	6	94;104	52	4/57	300	300	---	---	---	299
110	52	6	60;108	38	9/57	200	11	---	---	---	300
550	48	8	---	25	12/46	60	.27	---	---	---	302
600	36	8	---	32	---	60	.28	---	---	---	303
700	44	8	---	42	4/71	154	---	11	640	6.7	304
310	---	8	---	---	---	---	---	---	---	---	306
200	135	8	---	70	6/71	500	---	30	---	6.7	307
787	---	6	66;682;782	18	10/59	4	.44	---	---	---	309
400	36	6	55;180	3	10/63	3	.01	10	755	---	312
200	18	6	82;121	6	1963	50	.25	---	---	---	313
300	24	6	80;126	5	9/63	20	.15	---	---	---	314
250	---	8	---	8	7/71	50	.26	8	490	7.3	315
252	114	8	125;175;220; 247	70	6/60	217	11	---	---	---	322
445	24	6	140;208;343; 350;430	65	8/64	22	.44	---	---	---	323
350	---	6	---	51	8/72	7	.32	4	235	---	324
404	44	6	80;250;385	35	4/60	175	1.2	---	---	---	325
400	37	6	50;76;270; 350	75	11/62	76	1.7	---	---	---	326
490	62	6	312;469;480; 489	30	3/59	30	30	---	---	---	327
369	67	6	90;300	50	8/58	12	.30	---	---	---	328
175	82	6	---	9	5/72	15	---	2	110	---	329
138	56	6	121	43	12/70	50	1.1	13	590	7.4	330
565	24	6	140;560	90	7/62	3	.03	18	---	---	331
361	74	6	235;361	64	5/58	12	.33	3	140	---	334
250	---	---	---	---	---	30	---	---	---	---	335
660	42	12	191;315;495; 515	38	4/60	100	.89	---	---	---	336
60	57	10	58	30	5/61	300	300	---	---	---	337
63	54	8	55;61	24	4/61	500	---	---	---	---	338
80	71	6	80	35	11/70	60	---	---	---	---	339
260	97	8	147;165	38	10/60	200	4.8	---	---	---	340
190	114	6	145;164	46	11/70	425	85	---	---	---	341
98	83	6	87;94	20	4/71	150	1.9	15	710	7.1	342
550	38	10	94;145;405; 425	35	6/61	25	---	---	---	---	344
315	46	10	70;105;155; 240;310	30	2/61	550	14	16	790	7.1	345
200	20	10	20;52;80; 150;190	20	5/60	400	400	---	---	---	346
102	30	8	88;99	21	7/57	38	6.3	---	---	---	347
715	124	10	220	190	8/57	8	.23	---	---	---	348
350	325	8	---	---	---	10	---	---	---	---	349

TABLE 14.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Be-350	4018-7601	Citizens Utilities Water Co. of Pa.	Kohl Bros., Inc.	1959	U	424	V	€m/ls
351	4020-7601	do.	do.	1960	U	297	V	Oo/dol
352	4018-7601	do.	do.	1960	U	405	V	€m/ls
353	4019-7601	do.	do.	1962	U	350	V	€r/dol
354	4022-7613	Marion Fire Co.	do.	1957	F	437	H	Omy/ls
355	4024-7611	Howard Chapman	do.	1961	H	450	V	Ohy/arls
356	4021-7611	Marco Electric Mfg. Co.	do.	1949	U	438	H	Oe/ls
357	4025-7611	Michael Brehm	do.	1964	H	340	V	Oh3/sh
358	4027-7610	Tulpehocken Area Schools	do.	1963	T	500	V	Oh1/sh
359	4027-7610	do.	do.	1963	T	520	H	Oh1/sh
360	4030-7608	Pa. Dutch Camp Site	do.	1963	C	645	S	Oh1/sh
361	4025-7612	Boris Popoff	do.	1962	H	372	V	Oh3/sh
362	4025-7618	Mount Aetna Orchards	do.	1963	I	540	V	Oh8/---
363	4027-7615	Tulpehocken Sch. Auth.	do.	1957	T	564	H	Oh3/sh
364	4030-7616	Daniel Boone Council, B.S.A.	do.	1960	T	740	V	Oh1/ss
365	4026-7621	George Spannuth	do.	1958	H	481	S	Oh3/sh
391	4019-7551	St. Lawrence Bor.	do.	1964	U	460	V	€lc/dol
392	4019-7551	do.	do.	1964	U	---	V	€lc/dol
393	4023-7554	Western Electric Co.	do.	1958	U	390	S	€amc/dol
394	4022-7554	General Mills, Inc.	do.	---	U	450	S	Oh6/---
395	4033-7559	Puritan Sportsware, Inc.	Clarence F. Wink	1949	A	365	V	Oh1/---
396	4028-7623	Joseph Olesh	Kohl Bros., Inc.	1951	H	553	S	Oh1/---
397	4031-7545	Kutztown Bor.	do.	1965	P	415	V	Oe/ls
400	4019-7601	Hofmann Industries, Inc.	do.	---	N	340	V	€r/dol
401	4019-7600	do.	do.	---	U	340	V	€r/dol
402	4021-7556	Dana Corp.	do.	1941	U	240	V	€amc/dol
403	4021-7556	do.	do.	---	N	250	S	€amc/dol
404	4021-7556	Carpenter Technology Corp.	do.	1946	N	260	S	€amc/dol
405	4021-7556	do.	do.	1945	N	260	S	€amc/dol
406	4021-7556	do.	do.	1945	N	260	S	€amc/dol
407	4056-7556	do.	do.	1945	U	260	S	€amc/dol
409	4020-7556	Wyomissing Corp.	Kermit S. Snyder	1956	U	300	H	€r/dol
416	4026-7551	Kenneth Henry	do.	1964	H	485	S	€lv/dol
417	4031-7545	L. M. Kemp	Elwood C. Wessner	1941	H	480	S	Oj/arls
418	4030-7551	Allentown Portland Cement Co.	---	1962	H	420	S	Oj/arls
419	4020-7552	Mount Penn Bor. Mun. Auth.	---	---	R	---	V	€lv/dol
422	4019-7601	Citizens Utilities Water Co. of Pa.	Layne-New York Co., Inc.	1965	P	355	V	€r/dol
423	4020-7600	do.	do.	1965	P	320	V	Oo/dol
424	4018-7601	do.	---	1936	U	559	S	€r/dol
425	4018-7601	do.	---	1936	U	582	S	€r/dol
426	4018-7601	do.	---	1936	U	552	S	€r/dol
427	4018-7600	do.	Kohl Bros., Inc.	1955	U	440	S	€m/ls
428	4019-7556	Gilberts Associates	C. S. Garber & Sons, Inc.	1949	U	225	S	€bs/ls
429	4020-7557	Cresford Mills, Inc.	---	---	H	230	S	Or/dol
430	4018-7556	Kurtz Bros. Concrete, Inc.	Myers Bros. Drlg. Contr.	1955	N	255	S	€lc/dol
431	4019-7556	Gilberts Associates	C. S. Garber & Sons, Inc.	1948	A	225	S	€bs/ls
432	4019-7556	do.	do.	1948	A	225	S	€bs/ls
433	4020-7555	Theodore C. Auman, Inc.	do.	1939	A	235	S	€m/ls
434	4020-7555	Luden's Inc.	Kohl Bros., Inc.	1940	N	277	S	€m/ls
435	4020-7555	Astor Theatre	do.	1931	A	280	S	€lc/dol
436	4019-7556	Chestnut Operating Co.	do.	1925	N	198	V	€m/ls
437	4019-7556	do.	do.	1925	N	198	V	€m/ls
439	4018-7555	Prizer-Painter Stove Works, Inc.	---	---	U	250	V	€lc/dol
440	4020-7550	Embassy Theatre	Kohl Bros., Inc.	1931	U	280	S	€lc/dol
441	4020-7555	S. S. Kresge Co.	do.	1930	U	262	S	€m/ls
442	4020-7555	Reading Housing Auth.	do.	1939	U	283	S	€lc/dol
444	4019-7554	Berks TV Cable Co.	---	1938	U	270	S	€lc/dol
445	4020-7555	Reading Parking Auth.	Kohl Bros., Inc.	1940	U	265	S	€lc/dol
446	4019-7555	Berks Packing Co., Inc.	---	---	U	210	V	€bs/ls
447	4021-7555	The Glidden Co.	---	---	N	250	S	€amc/dol
448	4019-7555	Pa. Optical Co.	Kohl Bros., Inc.	1954	U	460	S	€lc/dol
449	4020-7555	Feel-Fine Shops, Inc.	do.	---	A	---	S	€m/ls

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
415	80	10	105	70	10/59	100	.29	---	---	---	8e-350
120	---	10	40	---	---	---	---	---	---	---	351
499	70	10	110;340	72	6/60	300	5.7	---	---	---	352
135	---	8	---	---	---	---	---	---	---	---	353
283	30	6	---	50	4/57	30	.33	13	---	---	354
88	28	6	63;85	5	1/61	12	.24	14	550	7.6	355
345	94	10	293	65	10/49	1200	100	---	---	---	356
200	21	6	38;169	28	8/64	12	.07	4	240	7.3	357
345	41	6	70;200;340	20	12/63	75	.58	---	---	---	358
400	53	6	72:101	75	12/63	15	.20	4	310	---	359
150	52	6	92;130	19	8/71	75	.74	2	100	---	360
260	36	6	110;250	20	5/62	10	.06	9	400	7.4	361
200	16	8	29;63;120	5	10/70	100	.54	---	---	---	362
200	44	6	87;138;187	54	10/70	30	---	3	200	6.7	363
155	55	6	103;132	32	11/60	60	1.6	3	175	---	364
202	---	6	50;185;193	30	6/58	30	.43	5	260	---	365
300	0	6	---	---	---	6	---	---	---	---	391
100	0	6	---	---	---	0	---	---	---	---	392
410	222	12	343;360;390	100	---	200	10	---	---	---	393
---	---	---	---	2	5/71	---	---	---	---	---	394
244	45	10	---	20	9/49	---	---	---	---	---	395
54	40	6	---	16	4/51	10	---	7	270	7.5	396
195	28	12	14;64;146;154;191	12	3/65	250	12	9	---	7.8	397
---	---	---	---	---	---	---	---	---	---	---	400
384	---	6	---	---	---	---	---	---	---	---	401
150	48	6	---	23	5/41	110	---	---	---	---	402
200	---	6	---	7	6/71	200	---	26	920	6.8	403
340	180	8	---	57	4/46	340	49	---	---	---	404
319	11	8	---	54	---	580	---	12	735	6.7	405
345	102	8	---	55	10/45	670	22	---	---	---	406
515	55	8	---	52	8/45	140	.94	---	---	---	407
400	210	8	---	69	12/56	400	4.9	---	---	---	409
213	125	6	---	160	11/71	18	---	9	300	8.0	416
87	---	6	---	13	10/71	8	---	21	760	7.7	417
75	---	6	---	26	4/65	40	---	17	575	7.8	418
394	---	8	---	10	2/65	89	.63	14	---	---	419
272	65	10	185;186;232;271	30	3/65	525	175	15	---	7.4	422
350	144	8	190;230;245;285;335	32	1/65	450	31	14	---	7.1	423
110	---	---	---	---	---	---	---	---	---	---	424
77	---	---	---	---	---	---	---	---	---	---	425
327	---	---	---	---	---	---	---	---	---	---	426
455	124	8	---	---	---	1	.01	---	---	---	427
346	108	7	---	35	1/49	---	---	---	---	---	428
480	---	---	---	---	---	55	---	---	---	---	429
150	60	8	---	23	4/71	94	---	14	650	7.1	430
586	47	9	---	56	2/48	409	17	18	880	7.5	431
888	110	8	---	11	4/71	383	4.8	---	---	---	432
140	---	8	---	---	---	500	---	---	---	---	433
400	69	10	---	67	1940	575	190	12	690	7.3	434
425	---	---	---	---	---	500	---	17	810	---	435
175	---	6	---	---	---	---	---	---	---	---	436
175	---	6	---	22	7/71	150	10	---	---	---	437
62	---	6	---	41	4/71	---	---	---	---	---	439
350	---	---	---	---	---	---	---	---	---	---	440
500	---	---	---	41	3/72	---	---	---	---	---	441
202	28	8	---	---	---	75	---	---	---	---	442
144	---	8	---	13	7/71	---	---	---	---	---	444
302	30	6	---	90	9/40	200	---	---	---	---	445
---	---	6	---	---	---	---	---	---	---	---	446
90	---	---	---	---	---	---	---	---	---	---	447
710	203	6	---	10	12/53	100	---	---	---	---	448
---	---	---	---	---	---	---	---	---	---	---	449

TABLE 14.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Be-454	4024-7554	Travis Perrotti	Kohl Bros., Inc.	1965	H	302	V	Ꞓlv/dol
455	4024-7555	Reading Drive-In Theatre	do.	1951	U	353	S	Ꞓlv/dol
456	4018-7556	City of Reading	do.	1954	U	240	V	Ꞓbs/ls
460	4026-7606	Sheidy Apartments	do.	1945	U	330	S	Oh3/---
461	4026-7606	Tri-R Shoe Co.	do.	1956	U	334	S	Oh3/---
462	4024-7555	Temple Corp.	do.	1954	U	335	V	Ꞓat/dol
463	4032-7558	Pa. Steel Foundry & Machine Co.	do.	1941	U	370	V	Oh1/---
464	4032-7558	do.	do.	1955	N	370	V	Oh1/---
465	4032-7558	do.	do.	---	N	370	V	Oh1/---
466	4032-7602	Blue Mountain Acad.	do.	---	U	475	V	Oh1/---
467	4033-7602	do.	do.	1954	T	560	H	Oh1/---
468	4033-7602	do.	do.	1954	T	565	H	Oh1/---
469	4033-7601	do.	do.	1955	T	500	V	Oh1/---
470	4027-7549	Garden State Tanning Co., Inc.	do.	1948	U	445	V	Ꞓat/dol
473	4032-7543	Maxatawny Sch. Auth.	do.	1954	T	500	H	Oj/arls
475	4021-7608	Elroy Master	do.	1939	R	440	V	Oo/dol
476	4021-7611	Marco Electric Mfg. Co.	do.	1946	U	445	H	Oe/ls
477	4018-7602	Atlantic Pipe Line Co.	do.	1941	U	399	S	Ꞓm/ls
478	4029-7550	Richmond Twp. Sch.	do.	1955	T	438	H	Ꞓamc/dol
479	4020-7555	Reading Housing Auth.	do.	1938	U	281	S	Ꞓlc/dol
480	4020-7555	Luden's Inc.	do.	1940	N	277	S	Ꞓm/ls
481	4022-7555	Goodwill Fire Co.	do.	1955	U	300	V	Ꞓamc/dol
482	4019-7556	O. B. Sweater Dyers, Inc.	do.	1948	U	210	V	Ꞓbs/ls
483	4019-7555	Malco Metal Trading, Inc.	do.	1943	U	235	V	Ꞓlc/dol
484	4020-7555	City of Reading	do.	1941	U	290	S	Ꞓlc/dol
489	4022-7555	Metropolitan Edison Co.	do.	1952	A	280	S	Ꞓam/dol
490	4022-7556	do.	do.	1952	A	280	S	Ꞓam/dol
491	4022-7556	do.	do.	1952	U	276	S	Ꞓam/dol
492	4019-7555	Luden's Inc.	do.	1945	A	282	S	Ꞓlc/dol
494	4020-7557	Wynnewood at Wyomissing	do.	1941	U	250	S	Ꞓamc/dol
495	4020-7559	Tulpehocken Farms	do.	1939	H	337	S	Oe/ls
496	4019-7559	Sturgis Pretzel Co.	do.	1954	U	340	S	Ꞓr/dol
497	4020-7557	Perry Reifsnyder	do.	1939	U	298	H	Ꞓr/dol
498	4023-7556	Dietrich's Milk Products, Inc.	do.	1942	U	306	S	Ꞓam/dol
499	4023-7556	do.	do.	1947	N	308	S	Ꞓam/dol
500	4023-7556	do.	do.	1954	N	303	S	Ꞓam/dol
501	4021-7602	Terrence McGlinn	do.	1954	H	545	H	Oh8/---
502	4022-7555	Mount Laurel Canning Co.	do.	1954	N	377	V	Ꞓlv/dol
503	4019-7555	Graff Bros. Trading Co.	do.	1941	U	210	V	Ꞓbs/ls
504	4028-7604	Raymond Shirk	do.	1971	H	446	S	Oh2/ls
505	4019-7556	B & J Saylor Foods Corp.	do.	1946	U	200	V	Ꞓbs/ls
507	4022-7553	---	do.	1946	U	560	S	Ꞓlc/dol
508	4019-7555	Pa. Optical Co.	do.	1940	A	255	S	Ꞓlc/dol
509	4019-7555	do.	do.	1954	U	254	S	Ꞓlc/dol
511	4029-7557	Glen-Gery Corp.	do.	1947	N	330	V	Oh1/---
513	4026-7548	Fleetwood Bor.	do.	1948	P	815	S	Ꞓha/meta
514	4026-7548	do.	do.	1948	P	810	S	Ꞓha/meta
515	4026-7548	do.	do.	1948	U	530	V	gn/meta
518	4030-7607	Roadside America	---	1942	C	610	S	Oh1/sh
519	4034-7553	Kerchner's Motel	Kermit S. Snyder	1945	C	365	V	Oh1/sh
520	4034-7547	Sky View Restaurant	Homer C. Herman	1961	C	770	H	Oh1/sh
524	4029-7557	Brush Beryllium Co.	Kohl Bros., Inc.	1966	N	360	S	Oh1/---
525	4027-7553	John J. Bisconti, Inc.	Lehigh Valley Well & Pump Co.	1966	N	330	V	Oo/dol
526	4024-7554	Anthony Valeriano	---	1965	H	430	V	Ꞓlv/dol
528	4033-7542	Richard Beggs	Kermit S. Snyder	1967	H	510	V	Oe/ls
529	4032-7541	Kenneth Seidel	---	---	H	460	V	Ꞓamc/dol
530	4030-7538	Mrs. Adam Mertz	R. H. Odenheiner Co.	1963	S	408	V	Ꞓam/dol
531	4031-7540	Mrs. E. N. Fink	do.	1961	H	476	S	Ꞓam/dol
532	4029-7538	J. W. Delong	C. S. Garber & Sons, Inc.	1968	H	440	V	Ꞓlv/dol
533	4030-7540	James Fenstermacher	do.	1965	H	428	V	Ꞓat/dol
534	4030-7541	Paul Moss	Kermit S. Snyder	1968	H	490	S	Ꞓlv/dol
535	4031-7542	Clair Snyder	C. S. Garber & Sons, Inc.	1966	H	508	H	Ꞓamc/dol
536	4030-7540	Elmer Fink	Clarence F. Wink	1964	H	430	V	Ꞓat/dol
537	4030-7541	E. H. Derr	C. S. Garber & Sons, Inc.	1964	H	485	H	Ꞓam/dol
538	4030-7542	E. S. Green	Kermit S. Snyder	1942	H	466	S	Ꞓat/dol

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
224	78	6	---	120	2/65	75	.81	---	---	---	Be-454
175	38	8	---	80	---	220	---	---	---	---	455
278	40	6	---	4	4/71	40	8.0	---	---	---	456
275	32	6	---	25	6/45	15	---	---	---	---	460
530	12	---	---	16	7/56	8	.47	---	---	---	461
232	41	6	---	37	6/71	100	---	---	---	---	462
341	40	8	---	16	10/41	76	---	---	---	---	463
112	56	8	---	30	12/55	90	1.3	---	---	---	464
199	51	8	---	---	---	108	.90	6	370	---	465
125	31	8	---	4	---	130	---	---	---	---	466
153	29	6	---	44	1954	55	.72	---	---	---	467
365	39	6	---	44	1954	---	.18	---	---	---	468
205	40	6	---	8	6/55	55	---	---	---	---	469
666	56	8	---	32	---	50	---	---	---	---	470
250	30	6	---	30	7/54	33	.27	15	725	---	473
154	---	8	---	F	11/70	80	.80	8	450	7.4	475
283	38	8	---	67	7/46	400	5.1	---	---	---	476
313	254	4	---	60	1/41	6	.04	---	---	---	477
275	25	6	---	87	10/71	23	.29	11	520	---	478
544	38	8	---	15	---	80	1.0	---	---	---	479
450	---	8	---	82	6/71	275	9.8	---	---	---	480
164	49	6	---	50	4/55	200	---	---	---	---	481
355	65	6	---	19	2/48	30	---	---	---	---	482
200	48	8	---	37	8/43	500	56	---	---	---	483
452	75	8	---	72	5/41	250	---	---	---	---	484
243	46	8	---	57	5/71	650	12	11	640	7.8	489
245	52	8	---	45	9/52	700	140	---	---	---	490
240	13	8	---	44	---	650	---	---	---	---	491
512	---	---	---	72	4/45	412	9.4	---	---	---	492
67	54	8	---	41	4/71	600	30	---	---	---	494
192	129	6	---	82	4/71	38	---	16	750	7.6	495
618	42	6	---	22	1/54	6	---	---	---	---	496
274	---	8	---	45	---	3	---	---	---	---	497
112	112	6	---	---	---	120	---	---	---	---	498
315	213	8	---	60	7/47	130	42	9	550	---	499
248	42	8	---	66	5/71	200	---	---	---	---	500
550	62	6	---	70	2/54	20	.15	3	160	---	501
555	347	6	---	70	10/54	120	---	---	---	---	502
387	34	6	---	20	4/41	70	.50	---	---	---	503
140	21	6	58;117;134	38	7/71	30	.29	4	180	---	504
596	22	6	---	8	2/46	190	---	---	---	---	505
234	154	4	---	152	6/71	7	.18	---	---	---	507
630	68	8	---	17	7/40	360	---	---	---	---	508
609	27	8	35;272;450; 520;540	11	3/54	170	---	---	---	---	509
261	43	8	---	28	2/70	162	4.4	---	---	---	511
296	23	6	---	40	10/66	30	.94	---	---	---	513
202	---	---	---	---	---	120	---	---	---	---	514
262	---	---	---	---	---	100	---	---	---	---	515
185	---	6	---	20	---	---	---	6	150	6.7	518
125	---	6	---	---	---	---	---	7	250	7.0	519
212	---	6	---	---	---	---	---	6	270	7.1	520
300	41	6	132;180	72	8/66	60	.28	---	---	---	524
200	40	8	---	---	---	400	---	---	---	---	525
116	94	6	---	85	2/65	50	---	---	---	---	526
247	240	4	150;202;225	115	9/67	40	---	---	---	---	528
111	100	6	---	72	9/67	28	1.1	8	480	---	529
65	---	6	---	24	9/67	---	---	11	635	---	530
190	---	6	---	80	9/67	---	---	12	690	---	531
190	161	6	166	17	10/71	75	---	5	295	---	532
140	109	6	---	31	4/68	20	.48	8	422	7.3	533
240	210	6	---	69	4/68	25	---	1	80	6.4	534
300	28	6	---	101	4/68	7	---	10	495	---	535
145	100	6	---	24	4/68	40	---	8	405	7.1	536
142	50	6	---	78	4/68	10	10	14	690	---	537
110	100	6	---	58	4/68	---	---	11	490	---	538

TABLE 14.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Be-539	4030-7537	Louis Wagner	---	---	U	457	S	€lv/dol
540	4030-7537	R. W. Harmony	R. H. Odenheiner Co.	1964	S	495	S	€lv/dol
541	4030-7538	do.	do.	1964	H	420	V	€at/dol
542	4031-7541	Ralph Fredrick	Kermit S. Snyder	1966	H	508	S	€am/dol
543	4030-7543	Valoris Green	do.	1968	H	501	H	€amc/dol
544	4030-7539	Stanley Turcha	Claude H. Otter	1961	H	410	V	€at/dol
545	4029-7557	Brush Beryllium Co.	Kohl Bros., Inc.	1966	N	355	V	Oh1/---
548	4027-7557	Leesport Bor.	do.	1967	P	359	V	Oh4/sh
550	4030-7558	Shoemakersville Bor.	Kermit S. Snyder	1965	P	355	S	Oh4/sh
552	4020-7552	Mount Penn Bor. Mun. Auth.	Kohl Bros., Inc.	1966	U	345	V	€lv/dol
553	4028-7558	Mohrsville Water Assoc.	Kermit S. Snyder	1967	P	340	V	Oh2/sh
554	4020-7552	Mount Penn Bor. Mun. Auth.	Kohl Bros., Inc.	1965	P	364	V	€lv/dol
555	4032-7542	Donald Zimmerman	Elmer C. Lenhart	1967	H	495	V	Oe/ls
565	4027-7616	Sterling Meyer	---	---	H	490	V	Oh3/---
566	4020-7557	North American Rockwell Corp.	Kohl Bros., Inc.	1951	U	288	S	€r/dol
569	4017-7558	Jacob Jasinski	Stephen Szilli	1957	H	380	S	T̄R/---
570	4020-7552	Mount Penn Bor. Mun. Auth.	Kohl Bros., Inc.	1966	U	338	V	€lv/dol
571	4019-7552	do.	Moody Drilling Co., Inc.	1966	U	290	V	€lc/dol
572	4019-7552	do.	do.	1966	U	310	V	€lc/dol
573	4020-7551	do.	do.	1966	U	448	S	€lv/dol
574	4019-7552	do.	do.	1966	U	312	V	€lc/dol
575	4020-7551	do.	do.	1967	P	410	V	€lv/dol
576	4020-7551	do.	do.	1968	P	395	V	€lv/dol
577	4020-7552	do.	do.	1967	U	365	V	€lv/dol
578	4023-7559	Heyco Metals Co.	Kohl Bros., Inc.	1969	N	360	H	Oo/dol
579	4028-7616	Modern Concrete Products Co.	Rufus A. Light	1968	N	522	V	Oh1/---
580	4027-7614	Teen Challenge Training Center	Kohl Bros., Inc.	1970	T	550	S	Oh1/sh
581	4022-7554	Western Electric Co.	do.	1970	N	385	S	€r/dol
582	4019-7601	Cacoosing Industries, Inc.	do.	1970	U	348	S	€r/dol
583	4036-7553	Big Valley, Inc.	Elmer C. Lenhart	1969	C	520	S	Oh1/sh
584	4032-7602	Blue Mountain Acad.	Kohl Bros., Inc.	1969	S	520	H	Oh1/---
585	4024-7553	Francesco DeSantis	do.	1969	I	620	S	gn/meta
586	4022-7557	Muhlenberg Twp. Auth.	do.	1970	U	233	V	€amc/dol
587	4018-7552	Richard Rimby	do.	1967	U	260	V	€lc/dol
588	4018-7552	do.	do.	1967	U	320	S	€lc/dol
589	4018-7552	do.	do.	1966	U	300	V	€lc/dol
590	4025-7607	Heidelberg, Inc.	do.	1969	U	320	S	Oh3/sh
591	4025-7607	North Heidelberg Water Co.	do.	1969	P	340	H	Oh3/---
592	4022-7610	Womelsdorf Bor. Sewage Auth.	do.	1968	H	350	V	Omb/sh
593	4020-7605	Robesonia-Wernersville Mun. Auth.	do.	1968	H	320	V	Oj/arls
594	4020-7605	do.	James Bucci	1966	H	320	V	Omb/sh
595	4020-7605	John Eisenhauer	Kohl Bros., Inc.	1968	H	382	S	Ohy/ls
596	4021-7609	Inter-Continental Wire Co.	do.	1967	U	478	V	Oe/ls
597	4021-7609	do.	do.	1967	U	485	S	Oe/ls
598	4021-7609	do.	do.	1967	N	485	S	Oe/ls
599	4026-7607	Bernville Medical Ctr.	do.	1968	C	400	H	Oh2/---
602	4026-7548	Fleetwood Bor.	do.	1967	P	575	V	€ha/meta
603	4019-7602	Atlantic Richfield Co.	do.	1966	C	370.	S	€m/dol
604	4020-7559	do.	do.	1966	C	310	V	Oe/ls
606	4018-7602	Brodel Fabricators, Inc.	James Bucci	1967	N	402	S	€m/ls
607	4020-7559	Citizens Utilities Water Co. of Pa.	Kohl Bros., Inc.	1967	U	335	V	Oe/ls
608	4019-7600	Hofmann Industries, Inc.	do.	1967	N	352	V	€r/dol
609	4033-7601	Blue Mountain Acad.	do.	1968	H	585	S	Oh1/---
610	4033-7601	do.	do.	1966	H	526	S	Oh1/sh
611	4033-7602	do.	do.	1968	T	607	S	Oh1/---
612	4033-7602	do.	do.	1968	H	595	S	Oh1/sh

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Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
60	---	48	---	56	4/68	---	---	9	470	---	Be-539
177	50	6	90;175	98	4/68	---	---	5	290	---	540
65	30	6	39;59	19	4/68	---	---	6	330	---	541
164	---	4	---	103	4/68	---	---	10	460	---	542
148	110	6	---	95	5/68	25	5.0	12	610	---	543
124	54	6	---	---	---	---	---	10	510	7.3	544
300	65	6	109;180	113	8/66	120	3.2	---	---	---	545
165	70	6	---	65	11/71	130	6.5	4	295	6.8	548
392	72	8	---	---	---	150	---	1	---	7.4	550
448	166	10	98;180;305	35	3/66	300	6	10	530	7.9	552
350	50	8	80;120;250	2	3/67	150	2.2	4	320	---	553
480	181	12	98;163;287;472	55	10/65	201	1.5	9	---	7.6	554
165	48	6	---	110	10/68	14	.70	8	435	---	555
54	---	6	---	7	10/70	---	---	10	475	---	565
163	30	8	---	44	4/71	---	---	---	---	---	566
---	36	6	40	11	4/71	8	---	8	330	7.7	569
505	24	10	45;106	12	8/66	40	.21	---	---	---	570
370	28	6	---	2	---	230	10	6	295	---	571
292	28	6	---	5	11/66	300	13	10	400	---	572
280	253	6	---	76	7/71	100	4.0	7	230	---	573
142	98	6	---	4	---	150	23	---	---	---	574
412	109	12	108;222;381	63	---	1000	45	8	270	---	575
390	104	12	107;365	42	2/67	1000	45	7	270	---	576
397	173	8	---	39	2/67	200	33	15	530	---	577
362	54	6	137;190	78	4/71	105	1.6	10	520	7.0	578
119	24	6	54;73;108	21	3/68	21	.52	6	340	7.6	579
220	92	6	103;150;178;205	27	8/71	45	.32	5	290	---	580
260	39	10	240	45	5/70	548	18	8	---	---	581
300	171	4	167;175;292	45	5/70	150	1.9	---	---	---	582
115	44	6	50;79;99	21	8/72	15	.29	2	---	---	583
280	102	6	118;206;274	39	11/70	20	.10	4	260	7.8	584
340	183	6	209;312;335	150	6/69	90	.60	---	---	---	585
405	60	10	60;72;108	14	5/71	900	38	15	---	---	586
220	19	6	79;174	5	6/71	20	.09	---	---	---	587
220	20	6	34;175	F	1/67	5	.04	10	475	---	588
455	33	6	48;336	70	11/66	20	.09	---	---	---	589
425	46	6	75;134;210;380	7	9/71	8	.02	---	---	---	590
300	42	6	66;71;93;174	38	9/71	70	.67	5	300	---	591
300	41	6	160;246	7	11/70	6	.04	11	560	7.3	592
200	21	6	121;158;184	4	12/70	100	.52	8	400	8.4	593
100	23	6	40;95	12	12/70	50	12	12	500	7.8	594
200	24	6	80;182	67	11/70	8	.06	13	700	7.8	595
95	58	6	64	36	1/67	275	275	---	---	---	596
300	43	6	206	36	11/70	15	.06	---	---	---	597
220	20	10	110;179;216	44	11/70	275	39	9	470	7.8	598
260	46	6	164;243	32	8/71	15	.09	3	180	---	599
300	150	6	18;47;78;200	10	1/67	60	2.1	4	---	---	602
140	60	6	107;122	42	5/71	30	.34	---	---	---	603
120	83	6	109;116	58	11/66	100	1.6	---	---	---	604
63	45	6	48;50;63	42	5/71	20	---	8	410	7.0	606
325	152	6	74;105;130;146;163;231;270	70	8/67	396	7.9	---	---	---	607
320	56	8	85;160;190;205	45	11/67	602	200	---	---	---	608
98	62	6	70;94	10	5/68	30	.43	---	---	---	609
100	42	6	51;74;90	7	6/66	20	.22	---	---	---	610
280	104	6	140;170;230;260	55	7/68	50	.24	3	170	---	611
200	81	6	140;170	45	5/68	20	.15	---	---	---	612

TABLE 14.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Be-613	4033-7601	Blue Mountain Acad.	Kohl Bros., Inc.	1968	H	565	S	Oh1/ss
614	4033-7602	do.	do.	1970	H	540	S	Oh1/ss
615	4024-7618	Mount Aetna Orchards	do.	1967	H	600	S	Oh8/---
616	4032-7541	Nelvin Voss	Harry H. Herman	1956	H	482	V	Or/dol
617	4030-7542	Topton Bor.	do.	---	U	495	V	Єlv/dol
618	4029-7541	do.	---	1908	P	690	V	gn/meta
619	4029-7542	do.	---	1913	P	518	S	Єlv/dol
620	4029-7541	do.	---	1920	U	680	V	gn/meta
621	4028-7541	do.	C. S. Garber & Sons, Inc.	1965	P	860	S	gn/meta
623	4026-7553	Maidencreek Twp. Water Auth.	---	---	U	430	V	Єlv/dol
624	4025-7552	do.	Kohl Bros., Inc.	1965	P	580	S	Єha/meta
625	4026-7614	Teen Challenge Training Ctr.	do.	1966	T	540	V	Oh2/sh
626	4027-7614	do.	do.	1966	H	523	V	Oh3/---
627	4031-7557	Zion Evangelical Lutheran Ch.	Clarence F. Wink	1968	H	403	H	Oh4/sh
628	4022-7554	Western Electric Co.	Kohl Bros., Inc.	1968	U	450	S	Єr/dol
629	4022-7554	do.	do.	1967	U	460	S	Єr/dol
630	4019-7601	Cacoosing Industries, Inc.	do.	1968	N	350	S	Єr/dol
631	4022-7611	Womelsdorf Mfg. Co., Inc.	do.	1966	N	382	V	Ohy/arls
632	4020-7605	John Eisenhauer, Inc.	do.	1968	C	363	V	Oe/ls
633	4026-7554	Ascoli Realty Corp.	do.	1967	I	350	S	Єat/dol
634	4026-7554	Giorgi Mushroom Co.	do.	1966	N	345	S	Єat/dol
635	4026-7554	Giorgio Foods, Inc.	do.	1967	N	358	S	Єat/dol
636	4022-7613	Zion Lutheran Ch.	do.	1969	H	428	S	Oa/ls
637	4024-7555	Goldstan Processing Corp.	do.	1967	N	343	S	Єat/dol
638	4025-7555	do.	do.	1967	C	315	V	Єat/dol
639	4025-7556	Village Furniture Galleries	do.	1967	C	300	S	Єam/dol
640	4025-7555	Myers Canning Co.	do.	1966	H	280	V	Єam/dol
641	4024-7604	Mt. Pleasant Inn	do.	1966	C	365	S	Oh4/---
642	4031-7558	Bammy's Gas Station	Kermit S. Snyder	1968	C	445	S	Oh4/sh
643	4030-7556	Perry Twp.	Clarence F. Wink	1968	H	420	S	Oh2A/ls
644	4029-7557	Wolfe Dye & Bleach Works, Inc.	Kohl Bros., Inc.	1966	N	340	S	Oh2A/---
645	4029-7557	do.	do.	1966	N	365	S	Oh2A/---
646	4024-7554	Quirino DiMarco	do.	1967	I	428	S	Єha/meta
647	4024-7555	Temple Greenhouse	Elmer C. Lenhart	1967	I	358	V	Єlv/dol
648	4052-7518	Richard Rimby	Kohl Bros., Inc.	1966	U	340	V	Єlc/dol
649	4022-7554	Western Electric Co.	do.	1968	U	380	S	Єr/dol
650	4019-7556	Baldwin Hardware Mfg. Corp.	do.	1965	N	260	S	Єbs/ls
653	4022-7556	Bell Telephone Co.	do.	1959	U	280	H	Єam/dol
654	4028-7623	Robert Strubhar	do.	1970	H	605	S	Oh1/sh
655	4029-7623	Gerald Miller	do.	1964	H	560	S	Oh1/sh
656	4029-7624	Nevin Dieffenbach	do.	1965	H	665	V	Oh1/ss
657	4029-7622	Carl Stonesifer	John H. Mays	1967	H	640	S	Oh1/---
658	4029-7621	Camp Swatara	Kohl Bros., Inc.	1968	H	540	V	Oh1/sh
659	4029-7621	do.	do.	1965	T	545	V	Oh1/sh
660	4029-7621	do.	do.	1964	R	570	V	Oh1/ss
661	4028-7621	Charles Martin	do.	1966	H	570	H	Oh1/sh
662	4028-7622	Levi Burkholder	do.	1970	H	555	S	Oh1/sh
663	4027-7622	William Myer	do.	1967	S	520	S	Oh1/sh
664	4028-7617	Shell Oil Co.	do.	1969	C	540	V	Oh1/sh
665	4029-7618	Ruth, Lena, and Irene Martin	do.	1969	H	570	S	Oh1/---
666	4028-7618	Samuel Schwartz	do.	1970	H	660	S	Oh1/sh
667	4028-7619	Ira Glick	do.	1969	H	560	H	Oh1/sh
668	4028-7619	Carl Miller	do.	1965	H	545	S	Oh1/ss
669	4029-7620	Wilbur Hershey	John H. Mays	1969	S	530	V	Oh1/---
670	4030-7619	Ernest Batz	Kohl Bros., Inc.	1969	H	730	S	Oh1/sh
671	4030-7619	John Reber	do.	1967	H	635	S	Oh1/sh
672	4030-7620	J. D. Backenstose	do.	1967	H	1400	S	Srt/ss
673	4027-7621	Ammon Boltz	do.	1962	H	518	S	Oh1/sh
674	4027-7620	Harry Fox	do.	1969	H	500	S	Oh3/sh

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
98	58	6	64;89	15	5/68	20	.31	2	110	6.7	Be-613
100	43	6	61;82	41	6/70	20	.34	---	---	---	614
140	25	6	69;89;127; 135	29	5/67	20	.18	3	175	6.8	615
234	176	5	230	49	11/71	17	17	11	570	---	616
297	---	8	---	29	3/66	192	2.1	---	---	---	617
152	40	6	---	41	1/58	44	.47	---	---	---	618
248	220	8	---	92	10/71	367	---	6	285	---	619
300	---	8	---	30	8/65	10	---	---	---	---	620
123	23	6	---	90	8/65	22	4.4	---	---	---	621
385	---	8	---	131	8/71	400	13	8	---	---	623
312	118	6	130;230;265;312	18	1964	39	.54	---	---	---	624
100	21	6	49;73;96	32	12/66	20	.29	3	180	---	625
120	21	6	53;87;109	45	8/66	20	.27	8	390	---	626
125	59	6	90;124	20	1968	75	3.8	---	---	---	627
185	120	6	---	87	5/71	---	---	---	---	---	628
500	96	6	120;174;230	119	10/67	8	.03	---	---	---	629
220	42	6	98;127;157	45	4/68	300	2.6	---	---	---	630
180	24	6	---	33	11/70	45	.33	14	690	7.5	631
140	60	6	101;134	56	9/68	50	.78	---	---	---	632
255	135	6	138;150;170; 220;230	75	7/67	200	2.9	---	---	---	633
180	87	6	110;139;170	70	7/66	80	.84	---	---	---	634
200	62	6	72;115;187	105	8/67	164	4.7	---	---	---	635
155	125	6	120;153	51	2/69	15	1.6	---	---	---	636
164	40	8	110;140	71	5/71	40	40	7	405	7.5	637
200	70	6	80;96;115; 140;184	55	9/67	30	.32	---	---	---	638
343	61	6	92;260;302	92	6/67	5	.02	16	960	7.5	639
155	40	6	80;135	11	6/71	30	.22	---	---	---	640
120	43	6	67;79;106	36	9/71	20	.24	11	700	---	641
166	60	6	110;129;163	20	12/68	30	.75	3	145	---	642
130	40	6	50;92;128	40	10/68	12	.40	8	440	---	643
440	22	6	103;209	72	7/66	60	.16	---	---	---	644
415	24	6	208;258	123	8/66	45	1.7	---	---	---	645
242	125	4	125;220;237	57	6/71	27	5.4	5	295	7.7	646
110	63	6	32;86;110	59	5/71	6	.19	7	400	7.3	647
400	20	6	---	11	3/72	20	.05	---	---	---	648
300	140	6	108;134;152; 175;280	41	5/71	430	25	---	---	---	649
405	51	6	160	60	3/65	35	.23	16	820	7.0	650
145	120	6	98;110;140	60	7/59	15	.75	18	---	7.5	653
200	103	6	158;170;184	75	5/70	30	.29	1	45	---	654
76	31	6	38;49;57	8	9/64	30	.44	12	510	---	655
120	63	6	80;117	13	9/70	15	.14	6	350	---	656
68	25	6	---	12	10/70	7	---	1	60	---	657
138	41	6	60;89;117	20	7/68	20	.18	---	---	---	658
138	25	6	63;78;135	6	10/70	15	.12	7	350	---	659
98	74	6	82	8	3/64	120	1.3	7	350	---	660
100	21	6	63;81	19	8/66	12	.15	8	370	---	661
97	31	6	52;61;72;84	11	5/70	50	.63	7	350	---	662
115	40	6	60;70;85	46	10/70	30	.50	13	550	---	663
363	46	6	52;138;182; 354	13	10/70	15	.05	10	480	6.4	664
75	32	6	40;60;65	10	10/70	50	.89	9	450	---	665
140	42	6	78;126	52	3/70	30	.34	2	145	---	666
115	34	6	44;76;103	18	4/69	20	.24	13	540	---	667
100	22	6	56;92	23	10/70	12	.16	---	---	---	668
70	---	6	---	9	10/70	50	---	8	380	---	669
170	42	6	50;78;98; 145	24	4/69	20	.15	9	350	---	670
120	24	6	62;114	8	8/67	30	.27	6	310	7.7	671
300	26	6	90	90	8/67	3	.01	1	80	---	672
126	72	6	65;118	15	3/62	20	1.5	9	400	---	673
133	41	6	51;90;128	20	3/69	20	.25	2	165	---	674

TABLE 14.

Well location		Owner	Oriller	Oate completed	Use	Alti- tude of land surface (feet)	Topo- graphic setting	Aquifer/ lithology
Number	Lat-Long							
Be-675	4027-7619	John Moyer	Kohl Bros., Inc.	1966	H	495	5	0h3/sh
676	4027-7620	Allen Snyder	Kermit S. 5nyder	1969	H	540	5	0h3/sh
677	4027-7620	Albert Lauer	Kohl Bros., lnc.	1966	H	480	V	0h3/sh
678	4026-7619	Carl Heffelfinger	do.	1966	H	505	S	0h6/sh
679	4026-7618	Catani & McLain	do.	1970	H	480	S	0h3/ls
680	4025-7618	Rodney Waldron	do.	1969	H	518	V	0h7/sh
681	4025-7618	Catani & McLain	do.	1970	S	472	V	0h6/ls
682	4025-7617	John Kintzer	do.	1968	H	575	H	0h7/---
683	4028-7617	Leroy Shucker	Rufus A. Light	1970	H	518	V	0hl/sh
684	4026-7618	Charles Stamm	Kohl Bros., Inc.	1969	H	480	V	0h3/sh
685	4025-7616	Robert Hibshman	do.	1968	H	610	S	0h7/sh
686	4024-7616	Harold Layser	do.	1959	H	620	H	0h7/sh
687	4024-7616	Cyrus Miller	do.	1964	H	520	V	0hy/arls
688	4023-7615	Richard Hollinger	do.	1968	H	435	V	0hy/arls
689	4022-7615	Harry Souders, Jr.	do.	1965	H	430	H	0my/ls
690	4024-7615	Allan Martin	---	1962	H	580	S	0hy/arls
691	4024-7615	P. M. Greth	Kohl Bros., Inc.	1960	H	527	5	0hy/arls
692	4027-7618	Augustus Edris	Kermit 5. Snyder	1966	H	540	H	0h3/---
693	4025-7615	Emanuel Billman	Kohl Bros., lnc.	1966	H	520	V	0h6/---
694	4026-7616	Oaniel Harnish	do.	1970	5	520	S	0h3/sh
695	4025-7616	Lee Stoltz	Kermit S. Snyder	1970	H	498	V	0h6/---
696	4026-7615	Harold Wise	John H. Mays	1962	H	620	H	0h3/sh
697	4028-7615	George Walmer	Kohl Bros., Inc.	1969	H	537	5	0hl/sh
698	4029-7616	Jacob Ulrich, Jr.	Rufus A. Light	1968	H	563	S	0hl/---
699	4029-7617	Earl Ebling	John H. Mays	1960	H	637	S	0hl/---
700	4029-7615	Theodore Manbeck	Kermit S. Snyder	1957	H	585	V	0hl/sh
701	4029-7613	James Brown	Kohl Bros., Inc.	1969	H	640	S	0hl/sh
702	4030-7613	Lloyd Oickinson	---	1966	H	765	S	0hl/---
703	4030-7612	William Gruber	Kohl Bros., Inc.	1969	H	815	5	0hl/sh
704	4030-7612	Carl Luckenbill	---	---	H	862	S	0hl/---
705	4031-7611	West Lawn B.5.A.	Kohl Bros., lnc.	1963	H	855	5	0hl/ss
706	4030-7611	George Longenecker	James Bucci	1963	H	680	S	0hl/---
707	4030-7609	Kenneth Kline	Kermit 5. 5nyder	1970	H	700	5	0hl/sh
708	4032-7607	John Henne	---	---	H	843	V	0hl/---
709	4031-7608	Robert Zipp	Kermit 5. Snyder	1960	H	704	S	0hl/---
710	4031-7605	Lester Breininger	Kohl Bros., lnc.	1961	H	560	V	0hl/ss
711	4031-7606	Herbert Shollenberger	Long	1949	H	660	V	0hl/---
712	4030-7606	Silas Henne	Kermit 5. Snyder	1970	H	570	V	0hl/ss
713	4030-7606	J. F. Brabant	Kohl Bros., Inc.	1969	H	540	V	0hl/ss
714	4030-7605	John Kalbach	Clarence F. Wink	1966	H	653	S	0hl/---
715	4030-7604	Robert Moseman	do.	1964	H	622	H	0hl/---
716	4031-7604	Oaniel Balthaser	---	1962	H	542	S	0hl/---
717	4032-7604	Paul Nave	5amuel N. Snyder	1946	H	630	5	0hl/---
718	4030-7601	Farm Home Admin.	James Bucci	1964	H	415	5	0hl/---
719	4032-7601	Lester 8ower	Kohl Bros., Inc.	1957	H	402	V	0hl/---
720	4032-7600	Allen Berk	Kermit 5. Snyder	1969	I	425	S	0hl/sh
721	4031-7601	Thomas Cadmus	do.	1969	H	605	H	0hl/---
722	4030-7600	Wolfe Oye & Bleach Works, Inc.	Kohl Bros., lnc.	1970	H	380	V	0hl/sh
723	4032-7601	Junita Workman	do.	1969	H	477	S	0hl/sh
724	4032-7603	Charles 5avage	Clarence F. Wink	1955	H	500	S	0hl/---
725	4034-7600	Franklin OeCosta	---	---	H	438	5	0hl/---
726	4033-7600	John 5chaeffer	Kohl Bros., Inc.	1970	H	520	5	0hl/ss
727	4031-7600	Matilda Metz	Kermit S. 5nyder	1961	H	340	V	0hl/---
728	4030-7603	Rae Hix	John H. Mays	1952	5	450	V	0hl/---
729	4030-7602	Charles Reinsel	Clarence F. Wink	1959	5	562	H	0hl/---
730	4031-7602	Charles Graeff	Kermit 5. 5nyder	1963	H	467	H	0hl/---
731	4031-7603	Arthur Wessner	Clarence F. Wink	1967	H	432	V	0hl/---
732	4033-7600	Rolland Shade	Kermit 5. Snyder	1969	H	540	H	0hl/---
733	4034-7601	Clyde Shollenberger	do.	---	H	540	S	0hl/---
734	4024-7612	Charles Reynolds	Kohl 8ros., Inc.	1969	H	440	5	0mb/sh
735	4024-7612	William Oonavan	Richard H. 5tanley	1966	H	450	S	0e/ls
736	4024-7614	George Manbeck	Kohl Bros., Inc.	1964	5	500	V	0hy/arls
737	4023-7612	Harold Gerhart	do.	1962	H	453	V	0hy/arls
738	4024-7612	Harry Hartranft	John H. Mays	1966	H	435	V	0hy/arls
739	4023-7613	Harold Epting	---	---	H	500	H	0hy/arls
740	4023-7613	George Firestine	Kohl Bros., Inc.	1967	H	425	V	0hy/arls
741	4022-7613	Ammon Houtz	do.	1966	C	430	H	0my/ls
742	4023-7614	Allan Martin	---	---	H	460	V	0hy/arls
743	4022-7614	Emmett 8eamesderfer	Kohl Bros., Inc.	1967	H	415	V	0a/ls
744	4022-7614	Melvin Hernley	do.	1970	H	443	S	0e/ls
745	4022-7614	Lester Myers	Myers Bros. Orlg. Contr.	1970	H	470	5	0e/ls
746	4022-7613	Norman Martin	Kohl Bros., Inc.	1966	H	400	V	0o/dol

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
100	21	6	22;63;83	12	11/66	30	.34	4	230	---	Be-675
120	49	6	72;103;115	38	4/69	15	.18	5	255	---	676
80	24	6	43;61;76	8	10/70	80	1.2	4	220	---	677
100	42	6	63;85	23	10/70	100	2.0	5	245	---	678
261	67	6	74;99;250	22	10/70	20	.10	8	395	7.0	679
220	41	6	117;170	F	12/69	8	.05	5	260	7.4	680
138	41	6	55;117	16	3/70	30	.26	8	420	6.8	681
260	46	6	64;126;241	32	5/68	12	.06	6	330	6.3	682
82	45	6	48;81	14	10/70	20	1.1	2	155	6.2	683
140	44	6	61;133	13	10/70	20	.16	4	220	7.8	684
270	44	6	78;160;240	80	2/68	5	.03	2	150	7.1	685
95	44	6	52;93	33	9/59	15	.36	5	300	6.0	686
80	34	6	46;61;73	9	10/70	30	.43	12	555	7.1	687
160	24	6	61;152	23	5/68	30	.22	13	600	7.5	688
158	26	6	70;77;156	36	3/65	10	.09	17	710	6.6	689
102	---	6	---	24	10/70	---	---	10	500	7.2	690
240	77	4	51;74;200	6	11/60	5	.11	5	320	7.7	691
111	40	6	---	22	1970	60	---	5	285	7.5	692
156	21	6	43;142	8	1/66	30	.20	6	305	7.7	693
200	55	6	62;90;178	25	4/70	9	.06	5	240	7.2	694
74	38	6	60;80	60	4/70	60	6.0	5	230	---	695
102	75	6	---	52	1970	---	---	3	130	6.2	696
180	43	6	52;78;150	60	11/69	10	.08	3	175	7.6	697
51	20	6	26;48	18	8/68	20	1.1	10	500	---	698
68	32	6	---	12	5/60	20	---	3	175	6.2	699
177	26	6	---	10	1970	40	.40	6	310	7.8	700
200	40	6	52;180	13	1970	15	.10	6	290	8.0	701
78	40	6	---	26	1970	---	---	3	155	6.2	702
98	40	6	70;87;94	10	12/69	25	.28	---	---	---	703
124	---	6	---	28	---	---	---	1	75	5.7	704
90	78	6	88	20	1970	15	.62	3	160	7.0	705
100	23	6	---	40	---	15	---	4	230	8.1	706
118	40	6	45;70;95	29	5/70	12	.15	4	220	8.0	707
80	---	6	---	35	1970	---	---	2	90	6.8	708
70	---	6	---	17	1970	---	---	4	190	7.0	709
138	33	6	54;83;125	26	11/61	15	.28	4	230	7.7	710
60	40	6	---	10	---	---	---	3	150	6.8	711
120	81	6	103;117	20	4/70	30	1.5	4	260	6.3	712
118	61	6	70;85	20	10/70	20	.27	4	220	7.9	713
175	40	6	---	62	1970	12	---	5	305	8.0	714
208	40	6	---	---	---	8	---	4	265	8.2	715
---	---	6	---	---	---	---	---	5	250	8.2	716
95	42	6	---	28	11/70	---	---	3	240	7.3	717
63	---	6	---	14	11/70	15	---	6	360	7.7	718
115	29	6	50;97;115	30	12/57	20	1.3	4	280	7.9	719
109	48	6	59;86;102	35	6/69	30	1.2	5	350	---	720
118	24	6	75;100	75	9/69	30	.55	4	240	7.3	721
98	30	6	38;55;68;96	F	3/70	50	.83	4	260	7.3	722
100	21	6	58;93	28	11/69	15	.21	4	260	---	723
62	---	6	---	10	11/70	---	---	2	155	6.8	724
62	---	6	---	28	11/70	---	---	3	200	7.1	725
160	21	6	100;151	76	6/70	12	.14	4	220	8.0	726
126	---	6	---	2	---	---	---	5	280	6.2	727
89	---	6	---	19	1970	---	---	2	150	5.9	728
162	---	6	---	---	---	---	---	6	265	7.4	729
111	37	6	---	38	11/70	35	---	5	260	7.4	730
60	---	6	---	5	---	---	---	6	320	8.2	731
145	38	6	72;102;141	75	7/69	26	1.7	5	280	---	732
95	---	6	---	54	11/70	---	---	51	140	7.4	733
425	40	6	70;112;200;423	47	11/70	20	.06	19	750	7.2	734
215	27	6	209	89	11/70	75	---	11	430	7.4	735
320	42	6	62;165;223	11	11/70	15	.04	7	375	7.6	736
100	37	6	10;50;97	5	11/70	50	.68	14	740	7.6	737
73	29	6	---	8	11/70	30	---	14	700	7.3	738
135	---	6	---	23	11/70	10	.77	12	700	7.8	739
200	30	6	105;194	25	7/67	20	.13	14	690	7.9	740
140	21	6	78;120	32	11/70	60	.59	14	930	6.6	741
---	---	6	---	8	11/70	---	---	15	770	7.5	742
158	24	6	54;106	24	11/70	30	.23	14	740	7.3	743
450	41	6	120	---	---	1	.01	---	---	---	744
402	42	6	---	77	11/70	1	.01	---	---	---	745
160	22	6	148	46	6/66	7	.07	20	960	6.7	746

TABLE 14.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Be-747	4022-7613	Webster Essig	Kohl Bros., Inc.	1965	H	410	S	Oa/ls
748	4022-7612	Eugene Noll	do.	1967	H	405	S	Omy/ls
749	4022-7611	W. L. Holzman	---	---	H	473	H	Ohy/arls
750	4022-7614	Gilbert Deck	Kohl Bros., Inc.	1962	H	430	H	Omy/ls
751	4023-7611	Harold Schenck	Kermit S. Snyder	1962	H	487	H	Ohy/arls
752	4022-7610	Ralph Miller	John H. Mays	1968	H	360	V	Oj/arls
753	4023-7611	Osborne Chapman	Kohl Bros., Inc.	1962	H	476	S	Ohy/arls
754	4022-7609	Carl Rienicher	do.	1967	H	415	S	Oe/ls
755	4022-7608	Howard Gelsinger	John H. Mays	1965	S	410	S	Oe/ls
756	4022-7612	Raymond Wise	Kohl Bros., Inc.	1959	H	397	V	Oe/ls
757	4022-7612	John Wenger	do.	1962	H	380	V	Omy/ls
758	4030-7621	Camp Swatara	do.	1959	H	650	S	Ohl/sh
759	4021-7610	Nelson Delp	do.	1969	H	500	S	€sc/dol
760	4020-7608	Luther Harman	do.	1965	H	495	S	€sc/dol
761	4021-7609	Daniel Bechtel	Richard H. Stanley	1967	H	535	S	Oe/ls
762	4021-7613	F. E. Dreistadt	---	---	H	430	H	€r/dol
763	4021-7608	Clarence Yoder	Kohl Bros., Inc.	1945	I	425	V	€r/dol
764	4021-7607	Robert Bright	do.	1965	H	507	S	Omb/sh
765	4022-7607	Alvin Brubaker	James Bucci	---	S	440	V	Oh8/---
766	4022-7610	W. B. Stauffer	Myers Bros. Drlg. Contr.	---	H	460	S	Oj/arls
767	4021-7609	Walter Conner	Chester Brendel	1956	H	540	S	Omb/sh
768	4022-7608	Donald Duncan	Kohl Bros., Inc.	1947	S	430	V	Oj/arls
769	4020-7606	Vincent O'Bold	do.	1965	H	380	V	Omy/ls
770	4021-7607	Jay Heiniman	do.	1966	H	490	H	Omb/sh
771	4021-7606	Fred Wenzel	do.	1958	H	360	V	Omb/sh
772	4020-7606	William Boisson	do.	1961	P	400	V	Omy/ls
773	4020-7605	M. G. Moore, Jr.	Richard H. Stanley	1970	H	387	S	Ohy/arls
774	4019-7606	Harry Boyer	Kohl Bros., Inc.	1969	H	540	S	€ha/meta
775	4018-7604	John Huntley, Jr.	Richard H. Stanley	1970	H	560	S	€ha/meta
776	4020-7604	Rupert Moest	Kohl Bros., Inc.	1967	H	540	H	Omb/sh
777	4021-7603	S. W. Ostrich	do.	1967	H	520	H	Oh8/sh
778	4020-7604	James Harnish	Robert O. Grant	1968	H	400	S	Ohy/arls
779	4020-7605	Charles Guiles	Kohl Bros., Inc.	1963	H	365	S	Omb/---
780	4020-7604	Ira Hill	Alvin Fritz	1950	H	418	S	Ohy/arls
781	4021-7604	Greg Leffler	Richard H. Stanley	1970	H	460	H	Oh5/sh
782	4022-7604	Guy LaFallette	Kohl Bros., Inc.	1964	H	415	H	Oh2/sh
783	4022-7604	F. I. Guinther	do.	1958	H	340	S	Oh2/sh
784	4022-7605	Lower Heidelberg B.S.A.	do.	1965	H	340	V	Oh8/sh
785	4022-7605	N. P. Katzaman	do.	1963	H	450	S	Oh2/---
786	4019-7602	Foscone's Golf Ctr.	James Bucci	1970	I	388	H	€r/dol
787	4020-7602	Francis Graeff	do.	1967	H	363	S	Oo/dol
788	4021-7600	Edward Hartman	Kohl Bros., Inc.	1969	S	270	V	Oe/ls
789	4021-7600	Edwin Mogel	Petersheim Bros.	1966	H	288	S	Oe/ls
790	4021-7601	Louis Thun	---	1963	H	350	V	Oo/dol
791	4020-7603	Stanley Egan	Morris Bailey	1970	H	360	V	Oo/dol
792	4019-7603	Samuel Huntsberger	Kohl Bros., Inc.	1941	R	318	V	Oo/dol
793	4018-7600	Citizens Utilities Water Co. of Pa.	do.	1956	U	440	S	€m/ls
794	4018-7601	do.	do.	1954	U	640	S	€r/dol
796	4019-7602	Gulf Oil Corp.	do.	1929	U	356	V	€r/dol
797	4019-7559	Pa. Dept. of Transportation	do.	1948	U	340	S	€r/dol
798	4018-7600	Citizens Utilities Water Co. of Pa.	do.	1956	U	440	S	€r/dol
799	4020-7559	do.	do.	1968	P	335	V	Oe/ls
800	4019-7555	Reading Brewing Co.	do.	1970	N	279	S	€lc/dol
801	4029-7612	Pa. Dept. of Transportation	do.	1971	H	615	V	Ohl/ss
802	4027-7620	Truck Terminal Motels of America, Inc.	do.	1971	C	506	S	Ohl/---
803	4022-7554	Muhlenberg Twp. Auth.	Petersheim Bros.	1968	P	410	V	€lc/dol
804	4022-7555	do.	Kohl Bros., Inc.	1965	P	350	S	€amc/dol
805	4019-7601	Hardesty-Quittner, Inc.	James Bucci	1964	N	340	S	€r/dol
806	4018-7603	John Vecolitis	Kohl Bros., Inc.	1964	H	450	V	€r/dol
807	4018-7603	W. M. Rightmeyer	do.	1919	H	430	S	€m/ls
808	4019-7604	Levi Moyer	---	1960	U	450	H	Ohy/arls
809	4020-7600	North American Rockwell Corp.	Kohl Bros., Inc.	1971	H	285	V	Oe/ls
810	4022-7559	J. V. O. Quereau	do.	1964	H	250	V	Oe/ls

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
300	12	6	60;154	42	11/70	6	.03	17	900	7.0	Be-747
120	21	6	89;112	23	4/71	20	.36	14	650	7.2	748
134	---	6	---	20	1/62	24	.34	21	2200	7.4	749
302	92	6	135;275;292	44	12/71	10	---	10	520	7.4	750
80	25	6	---	21	11/70	48	---	14	790	7.9	751
205	---	6	60	60	---	4	---	14	750	6.9	752
215	40	6	63;190	20	4/62	15	.09	---	---	---	753
140	22	6	52;110	62	9/67	10	.13	14	735	7.2	754
128	---	6	---	48	11/70	40	---	13	620	7.4	755
189	33	6	180	18	11/70	12	.40	9	460	8.0	756
200	18	6	27;93;170;195	28	5/62	30	.20	11	580	7.1	757
100	42	6	90	30	9/59	20	.40	---	---	---	758
134	125	6	130	50	10/69	30	.38	5	240	8.4	759
336	205	4	336	90	9/65	6	.10	9	450	7.3	760
112	97	6	112	76	11/70	10	---	---	---	---	761
---	---	6	---	37	11/70	---	---	14	710	7.3	762
142	60	6	---	41	11/70	12	.30	10	550	7.5	763
200	27	6	50;97	36	11/70	12	.09	7	390	8.0	764
140	---	6	---	14	11/70	---	---	10	550	6.7	765
36	---	6	---	15	11/70	35	---	15	790	6.0	766
190	---	6	---	29	11/70	---	---	11	480	7.4	767
86	23	6	---	25	11/70	10	1.0	14	750	7.9	768
200	22	6	81;196	14	6/65	20	.11	---	---	---	769
140	42	6	61;132	59	11/66	12	.15	8	460	8.0	770
80	12	6	60;80	F	11/70	24	.67	11	680	7.6	771
243	42	6	92;140	27	11/70	15	.19	11	650	7.3	772
302	43	6	35;245	36	11/70	14	.13	16	880	6.8	773
195	130	4	130;150	76	3/72	30	.40	---	---	---	774
240	236	6	128;239	111	3/72	6	.12	3	140	---	775
137	42	6	70;95;132	38	11/70	30	.32	5	235	6.5	776
261	56	6	94;164;255	60	9/67	9	.05	9	410	8.0	777
133	40	6	65;128	18	5/68	7	.06	15	700	7.9	778
338	24	6	196;330	41	11/70	12	.04	8	380	7.2	779
132	17	6	130	18	11/70	6	.16	10	490	---	780
230	39	6	85	50	10/70	6	.03	---	---	---	781
343	22	6	201;326	76	8/64	10	.04	---	---	---	782
76	14	6	33;75	21	9/58	20	1.1	7	315	7.4	783
58	32	6	37;45;57	12	12/70	50	1.4	3	160	---	784
200	57	6	70;120;195	29	12/70	30	.22	7	330	7.5	785
160	36	6	80;110;155	67	12/70	30	---	17	695	7.8	786
553	---	6	500	91	12/70	2	.01	13	660	7.1	787
138	40	6	52;131	38	12/70	20	.21	22	900	6.7	788
378	29	6	201;368	22	12/70	12	---	11	450	8.0	789
294	---	6	---	63	12/70	15	.43	14	590	8.3	790
96	35	6	---	40	4/70	20	4.0	10	495	6.8	791
67	44	6	---	15	12/70	144	3.3	---	---	---	792
423	228	8	---	---	---	7	---	---	---	---	793
305	85	8	---	230	4/54	20	---	---	---	---	794
600	---	---	---	---	---	3	---	---	---	---	796
624	12	6	---	13	1/48	---	---	---	---	---	797
315	170	6	---	70	---	3	---	---	---	---	798
297	220	6	74;101;105;115;130;146;230;270	106	4/71	375	6.7	13	---	7.9	799
178	120	6	140;150;175	79	12/70	350	58	14	860	7.7	800
150	45	6	78;102;138	10	8/71	110	6.1	---	---	---	801
400	52	8	59;110;191;230;265	20	5/71	92	.29	9	450	---	802
500	110	8	96;140;230;280;306;348;365;405;418	10	3/68	500	15	5	280	7.8	803
320	145	6	226;238;263	97	4/71	215	6.7	---	---	---	804
106	100	6	---	32	4/71	400	---	14	650	7.8	805
138	101	6	117;126	9	4/71	30	.23	11	495	7.8	806
147	---	6	---	74	4/71	---	---	12	570	7.5	807
310	---	6	---	45	1/60	2	.06	---	---	---	808
96	37	6	70;76;94	21	4/71	50	1.0	11	395	8.0	809
118	27	6	94	32	10/64	200	2.9	12	495	---	810

TABLE 14.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Be-811	4021-7559	Tulpehocken Farms	---	---	H	263	V	Oo/dol
812	4020-7558	Goodman Co.	---	1944	U	340	H	€amc/dol
814	4018-7559	H. J. H. Realty Corp.	Richard H. Stanley	1968	C	335	V	€r/dol
815	4018-7559	Samuel Wanner, Jr.	do.	1968	H	425	S	€bs/ls
816	4018-7559	Evan Shoup	Kermit S. Snyder	1968	H	330	S	€m/ls
817	4022-7611	Yarn Manufacturers, Inc.	Richard H. Stanley	1968	N	400	V	Ohy/arls
818	4017-7556	Mark Sweitzer	---	---	H	300	V	€lc/dol
819	4018-7556	Ruth Seidt	---	---	U	278	V	€lc/dol
820	4018-7557	Shillington Bor.	---	---	U	---	S	€bs/ls
821	4021-7555	Polymer Corp.	Kohl Bros., Inc.	1963	U	280	S	€amc/dol
822	4020-7557	North American Rockwell Corp.	---	---	N	300	S	€r/dol
823	4020-7557	do.	---	1948	U	260	S	€r/dol
824	4021-7556	Carpenter Technology Corp.	Kohl Bros., Inc.	1965	N	237	V	€amc/dol
825	4021-7556	do.	do.	1968	N	250	V	€amc/dol
826	4021-7558	Security of America Life Ins. Co.	---	1935	H	---	S	€amc/dol
827	4021-7558	Tulpehocken Farms	---	1936	S	242	S	€amc/dol
828	4021-7559	do.	James Bucci	---	H	320	S	Or/dol
829	4022-7559	Richard Mease	Kermit S. Snyder	1960	H	330	H	Oo/dol
830	4023-7558	Ronald Oister	Kohl Bros., Inc.	1970	H	330	H	Oe/ls
831	4023-7559	Edith Epler	do.	1966	H	350	S	Oo/dol
832	4023-7559	Bern Twp.	James Bucci	1967	H	356	S	Oo/dol
833	4023-7558	Fabrication Specialists Inc.	do.	1966	N	365	H	Oo/dol
834	4024-7559	Dale Regula	---	---	I	608	H	Oh6/---
835	4022-7558	Daniel Hiester	---	---	H	237	V	€amc/dol
836	4020-7559	Tulpehocken Farms	---	---	N	340	S	Os/ls
837	4020-7558	Singer Equipment Co., Inc.	---	1955	H	301	S	€amc/dol
838	4020-7558	Valeria Hoffert	---	1903	H	342	H	€amc/dol
839	4023-7600	Berks County	Kohl Bros., Inc.	1952	U	297	S	Oe/ls
840	4022-7601	do.	---	---	U	305	S	Oe/ls
841	4024-7557	Donald Haas	Richard H. Stanley	1967	H	280	V	Or/dol
842	4024-7557	Donald Graeff	Elmer C. Lenhart	1970	H	250	V	Oo/dol
844	4024-7557	Edward Kemmerer	Richard H. Stanley	1970	H	260	V	€amc/dol
845	4022-7556	William C. Cremer & Sons	Kohl Bros., Inc.	1959	H	280	S	€am/dol
846	4023-7556	St. Lawrence Dairy	Samuel N. Snyder	1940	U	300	S	€am/dol
847	4021-7555	Ralph Elias	Kohl Bros., Inc.	1970	I	280	V	€r/dol
848	4023-7555	Berks Products Corp.	do.	1957	C	340	H	€am/dol
849	4024-7557	Warren Hill	Elmer C. Lenhart	1967	H	280	V	€am/dol
850	4024-7555	Prestolite Batteries Div. of Eltra Corp.	Kohl Bros., Inc.	1959	U	330	V	€at/dol
851	4023-7559	Blanche Stettenbauer	Kermit S. Snyder	1956	H	335	S	Oo/dol
852	4025-7556	Russell Smith	Elmer C. Lenhart	1968	H	324	S	€am/dol
853	4025-7556	F. O. Miller	Kohl Bros., Inc.	1969	H	260	V	€am/dol
854	4025-7556	Zeb Machine Co.	do.	1963	H	325	H	€am/dol
855	4026-7555	Pa. Game Commission	do.	1960	H	318	S	€am/dol
856	4026-7555	M. N. Morganti	do.	1968	H	320	S	€am/dol
857	4024-7554	Julio Savini	C. S. Garber & Sons, Inc.	---	I	477	S	€am/dol
858	4024-7554	Filippo Santarelli	---	---	I	438	S	€lv/dol
859	4024-7555	A & A Mushroom	---	---	U	370	V	€lv/dol
860	4024-7554	Mario Fabiani	Samuel N. Snyder	1934	U	485	S	€lv/dol
861	4024-7554	Nick Memmo	Kohl Bros., Inc.	1961	I	580	S	€ha/meta
862	4025-7554	DiSantis Bros.	---	1964	I	520	S	€ha/meta
863	4024-7554	Gaetani Bros.	Kohl Bros., Inc.	1957	I	470	S	€ha/meta
864	4024-7557	J. H. Boeshore	Samuel N. Snyder	1940	H	338	H	€am/dol
865	4023-7557	Frank Borek	---	---	H	346	H	€amc/dol
866	4023-7557	W. R. Speakman	Elmer C. Lenhart	1949	U	310	S	€am/dol
867	4023-7557	Phyllis Brown	Kohl Bros., Inc.	1954	U	315	S	€am/dol
868	4023-7557	Jean Shaw	do.	1954	U	308	S	€am/dol
869	4023-7553	Theodore Abeln	Elmer C. Lenhart	1967	H	510	V	€lc/dol
870	4022-7553	Effie Magyar	Thomas Shiller	1950	H	470	V	€lc/dol
871	4024-7554	Edgewood Mushroom	Kohl Bros., Inc.	1965	I	520	S	€am/dol
873	4025-7554	Ontelaunee Farms, Inc.	do.	1958	U	498	S	€ha/meta
874	4023-7557	W. T. Boeshore, Jr.	---	---	H	308	V	€am/dol
875	4026-7557	Quaker Maid Kitchens, Inc.	James Bucci	1963	U	352	H	Oe/ls
876	4026-7557	do.	do.	1963	U	353	H	Oe/ls

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
285	---	6	---	22	4/71	---	---	20	790	7.6	8e-811
260	---	6	---	28	4/71	---	---	---	---	---	812
113	48	6	32;43;110	36	4/71	12	.40	12	505	7.7	814
360	88	6	130	98	4/71	3	.01	17	650	7.0	815
195	95	6	140	36	4/71	2	---	31	920	7.2	816
80	37	6	18;55	7	4/71	30	---	10	495	8.0	817
32	---	---	---	23	4/71	---	---	11	600	7.4	818
24	---	6	---	21	4/71	---	---	---	---	---	819
350	---	8	---	---	---	350	---	---	---	---	820
108	46	6	---	37	4/71	---	---	---	---	---	821
200	---	12	---	70	---	---	---	---	---	---	822
127	---	6	---	19	4/70	---	---	---	---	---	823
300	21	12	99;120;247	25	10/68	610	32	---	---	---	824
350	42	10	---	31	5/68	700	23	11	605	7.3	825
90	---	6	---	---	---	---	---	14	700	8.0	826
78	---	6	---	39	9/68	---	---	11	600	7.6	827
100	---	6	---	92	4/71	---	---	7	340	7.5	828
174	36	6	---	75	4/71	30	---	14	720	7.3	829
507	21	6	495	52	4/71	4	.01	15	650	7.7	830
218	20	6	70;93;180	25	4/71	20	.13	15	700	7.3	831
140	23	6	17;80;100	2	4/71	5	---	8	480	7.8	832
130	---	6	---	71	4/71	---	---	12	635	7.2	833
367	40	6	---	40	1958	20	---	5	410	6.0	834
36	---	6	---	14	---	---	---	11	600	7.1	835
380	---	6	---	95	4/71	---	---	18	650	7.3	836
357	---	6	---	101	4/71	---	---	13	650	7.2	837
56	---	6	---	24	4/71	---	---	---	---	---	838
60	54	6	---	30	4/71	30	---	---	---	---	839
79	---	48	---	67	4/71	---	---	---	---	---	840
305	36	6	155;298	37	5/71	38	1.9	11	525	7.0	841
248	130	6	20;122;248	19	6/70	14	14	6	340	7.9	842
41	25	6	18;40	19	5/71	20	20	10	550	---	844
120	108	6	110;118	55	7/59	15	.60	8	500	7.6	845
95	---	8	---	36	5/71	60	---	---	---	---	846
135	122	6	125;130	49	5/71	50	.96	14	770	---	847
242	62	6	92;180;228;240	62	6/71	18	.45	---	---	---	848
304	20	6	94;205;243;300	37	5/71	8	.08	14	660	7.5	849
228	78	6	209	40	---	25	5.0	---	---	---	850
260	132	6	---	35	6/71	12	.15	12	585	7.5	851
197	23	6	61;148;197	51	6/71	8	.08	14	610	6.2	852
300	41	6	70;260;290	30	10/69	12	.04	11	505	7.4	853
116	20	6	114	62	6/71	20	.50	15	660	6.2	854
200	34	6	152;187	41	6/71	30	.42	8	740	6.7	855
120	24	6	83;98;107	28	6/71	30	.36	9	450	6.5	856
---	---	6	---	191	6/71	---	---	4	210	7.6	857
---	---	6	---	149	6/71	---	---	6	280	7.6	858
14	0	6	---	62	6/71	---	---	---	---	---	859
320	---	6	---	---	---	5	---	---	---	---	860
238	136	6	142;175;238	77	6/71	15	.14	1	60	5.2	861
200	---	6	---	12	6/71	---	---	1	55	5.5	862
306	233	6	40;238	15	2/57	20	.57	---	---	---	863
65	---	6	---	40	6/71	---	---	12	550	7.7	864
380	---	6	---	73	6/71	---	---	16	800	6.6	865
231	49	---	---	---	---	4	---	---	---	---	866
695	22	6	---	35	6/54	12	---	---	---	---	867
348	64	8	---	40	---	8	---	---	---	---	868
133	134	6	60;111	104	6/71	10	20	8	345	7.7	869
106	---	6	---	55	6/71	---	---	7	390	7.3	870
352	---	6	---	---	---	16	16	---	---	---	871
493	257	4	208	202	7/58	6	---	---	---	---	873
90	---	6	---	35	6/71	---	---	9	450	7.6	874
277	---	6	---	62	6/71	5	---	---	---	---	875
340	---	6	---	62	6/71	5	---	---	---	---	876

TABLE 14.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Be-877	4026-7557	Quaker Maid Kitchens, Inc.	James Bucci	1964	U	352	H	Oe/ls
878	4021-7556	Reading Flotilla Training Base	---	---	U	223	V	Єamc/dol
879	4021-7556	Dana Corp.	Kohl Bros., Inc.	1948	U	230	V	Єamc/dol
880	4021-7556	do.	do.	1951	U	230	V	Єamc/dol
881	4019-7555	Pa. Optical Co.	do.	1959	U	254	S	Єlc/dol
885	4018-7552	James Bucci	James Bucci	---	U	330	S	Єlc/dol
886	4026-7556	John and Edward Hartman	Kohl Bros., Inc.	1970	S	320	S	Єamc/dol
887	4027-7553	S. P. Randazzo	do.	1960	I	350	S	Oo/dol
888	4032-7559	Mid Atlantic Canners	do.	1971	N	350	V	Oh1/ss
889	4032-7559	do.	do.	1971	N	348	V	Oh1/ss
890	4032-7559	do.	do.	1971	U	350	V	Oh1/ss
891	4027-7553	John J. Biscanti, Inc.	James Bucci	1966	U	340	S	Oo/dol
892	4027-7553	do.	do.	1966	N	332	V	Oo/dol
893	4027-7553	do.	Kohl Bros., Inc.	1965	I	380	H	Oo/dol
894	4027-7553	do.	do.	1964	I	382	H	Oo/dol
895	4028-7553	Allentown Portland Cement Co.	C. S. Garber & Sons, Inc.	1964	N	330	S	Oj/arls
896	4028-7553	do.	do.	1970	N	323	V	Oj/arls
897	4026-7551	Evergreen Mushroom Co.	Kohl Bros., Inc.	1962	I	725	S	Єlv/dol
898	4026-7554	Ascoli Realty Corp.	do.	1959	I	344	S	Єat/dol
899	4026-7554	do.	do.	1971	I	360	S	Єat/dol
900	4025-7554	Dante Santoni	do.	1962	I	388	S	Єlv/dol
901	4025-7553	Harold Loose	Morris Bailey	1948	H	517	S	Єlv/dol
902	4027-7554	Francis Shollenberger	---	---	U	350	S	Or/dol
903	4028-7552	Dennis Heffner	James Bucci	1966	H	362	V	Oo/dol
904	4030-7608	Pa. Dutch Campsite	do.	1970	C	650	S	Oh1/---
905	4030-7608	Pa. Dept. of Transportation	Kohl Bros., Inc.	1971	H	600	V	Oh1/ss
906	4029-7611	S. E. Woznicki	do.	1970	H	645	H	Oh1/sh
907	4029-7611	Lewis Yiech	do.	1944	H	580	S	Oh1/---
908	4029-7610	Paul Anthony	do.	1967	H	533	V	Oh1/sh
909	4029-7610	George Anthony	do.	1969	H	525	S	Oh1/sh
910	4029-7609	do.	do.	1969	S	495	S	Oh1/sh
911	4025-7614	H. W. Zimmerman	do.	1968	H	545	S	Oh7/---
912	4025-7614	Winslow Hill	do.	1967	H	530	S	Oh6/sh
913	4025-7613	James Deturck	do.	1970	H	562	H	Omb/---
914	4028-7608	William Spohn	Kermit S. Snyder	1968	H	460	S	Oh1/sh
915	4027-7608	F. C. Henderson	Kohl Bros., Inc.	1964	H	382	S	Oh1/---
916	4028-7607	Wayne Stertzel	do.	1969	H	492	H	Oh1/---
917	4028-7614	Brian Lape	do.	1969	H	560	S	Oh1/---
918	4027-7613	Horace Schucker	do.	1959	H	575	S	Oh1/---
919	4028-7612	Harry Fry	do.	1965	H	590	S	Oh1/sh
920	4026-7611	Solly Gernsheimer	do.	1963	H	485	S	Oh1/sh
921	4026-7611	Jackson Nye	do.	1963	S	450	S	Oh2/sh
922	4025-7611	Leroy Stauffer	do.	1968	H	470	H	Oh2/ls
923	4026-7613	Mrs. Arthur Rick, Jr.	do.	1965	I	480	S	Oh2/ls
924	4026-7614	Lee Webber	do.	1969	H	460	V	Oh2/ls
925	4027-7508	L. M. Burkholder	do.	1966	H	380	S	Oh2/ls
926	4026-7608	Kenneth Miller	do.	1965	H	380	S	Oh3/sh
927	4025-7608	Heidelberg Country Club	do.	1963	H	370	H	Oh2/ls
928	4027-7609	Frank Beck	do.	1969	H	464	H	Oh1/sh
929	4027-7610	James Lorah	do.	1969	H	480	H	Oh1/sh
930	4024-7610	Robert Keller	do.	1970	H	430	V	Oh3/sh
931	4024-7610	T. P. Handwerk	do.	1965	H	320	V	Oh2/ls
932	4024-7609	Carl Fry	do.	1970	H	385	S	Oh2/sh
933	4024-7609	Edward Reich	do.	1966	H	383	V	Oh4/---
934	4023-7609	F. C. Bender	James Bucci	1967	H	485	H	Oh4/ls
935	4022-7610	Robert Snyder	Kohl Bros., Inc.	1970	H	430	S	Oh4/ls
936	4028-7613	Lloyd Sensenig	---	1960	H	580	S	Oh1/---
937	4023-7608	Thomas Tabor, Jr.	Kohl Bros., Inc.	1971	H	460	V	Oh4/---
938	4023-7607	do.	do.	1969	H	420	S	Oh4/ls
939	4024-7607	Ronald Schlaybach	do.	1969	H	550	S	Oh3/sh
940	4025-7609	Carl Heffner	Morris Bailey	1970	H	385	S	Oh2/---
941	4026-7609	Leon Bender	James Bucci	1969	H	485	H	Oh2/---
942	4026-7612	Richard Moyer	John H. Mays	1966	S	560	S	Oh3/sh

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
120	---	6	---	---	---	---	---	---	---	---	Be-877
115	---	6	---	13	6/71	5	5	---	---	---	878
90	90	6	---	35	---	200	---	---	---	---	879
73	75	6	---	55	1951	200	---	---	---	---	880
400	86	8	94;175;230	23	7/71	20	1.0	---	---	---	881
98	---	6	---	39	7/71	---	---	---	---	---	885
138	50	6	78;130	31	8/71	200	2.7	16	740	---	886
213	18	6	145;200;210	30	7/60	33	33	---	---	---	887
506	36	8	71;94;120;185;260;363	7	8/71	65	.38	---	---	---	888
420	54	6	70;135;235	8	8/71	145	.75	9	600	---	889
500	42	6	70;157	6	8/71	20	.04	---	---	---	890
350	---	6	---	35	8/71	2	---	---	---	---	891
100	---	6	---	---	---	200	---	---	---	---	892
570	13	6	40;375;440	72	8/71	30	.17	---	---	---	893
193	---	6	---	---	---	---	---	18	880	---	894
200	---	8	---	17	12/64	300	---	---	---	---	895
60	28	8	---	6	1970	100	---	---	---	---	896
354	280	5	142;180;350	---	---	45	45	3	200	---	897
189	47	6	70;150;175;183	60	5/59	25	25	6	310	---	898
260	84	6	90;110;156;240	66	8/71	200	1.7	---	---	---	899
179	91	6	150;170	91	7/62	60	2.1	7	350	---	900
280	260	4	---	213	8/71	8	2.7	4	240	7.5	901
150	---	6	---	23	8/71	---	---	13	650	---	902
339	23	6	339	31	8/71	100	---	11	530	---	903
160	28	6	80;130;155	20	---	100	---	---	---	---	904
200	82	6	141;167;176;194	11	8/71	44	.67	---	---	---	905
178	42	6	58;117;156;170	9	5/70	15	.09	4	230	---	906
139	21	6	---	24	4/69	25	.96	---	---	---	907
98	34	6	58;71;89	14	12/67	60	.79	5	310	---	908
158	62	6	103;117;142	60	11/69	30	.33	---	---	---	909
160	81	6	92;148;154	26	8/71	50	.43	4	240	---	910
160	46	6	76;113;141	27	8/71	25	.22	3	160	6.4	911
160	42	6	120;139;155	61	5/67	30	.30	4	195	---	912
200	61	6	76;85;155	75	1/70	6	.05	7	335	---	913
118	23	6	98;110;118	37	11/68	24	.39	5	225	---	914
205	31	6	70;162;180;197	25	8/71	15	.27	4	235	---	915
180	42	6	70;120;160	62	8/71	25	.25	4	220	---	916
118	41	6	51;102;110	48	8/69	15	.29	3	155	---	917
112	38	6	50;110	35	6/59	15	1.0	1	70	---	918
180	40	6	82;116;140	14	8/65	30	.21	3	160	---	919
220	42	6	60;140;190	18	1/63	10	.06	6	295	---	920
94	26	6	63;92	7	8/71	20	.23	4	190	---	921
280	64	6	103;271	36	8/71	10	.04	6	320	7.7	922
100	21	6	62;89	12	6/65	12	.14	6	310	---	923
504	98	4	184;408;485	4	8/71	10	.07	2	265	---	924
80	23	6	48;77	20	8/71	20	.41	6	315	---	925
97	41	6	48;90	32	7/65	50	.86	5	260	---	926
68	43	6	45;62	35	9/63	20	3.3	8	420	---	927
215	46	6	61;92	46	8/71	6	.04	5	290	---	928
138	53	6	70;125	33	8/71	25	.28	5	310	---	929
100	22	6	52;81	15	8/71	20	.24	5	240	---	930
140	21	6	95;115;130	24	8/65	25	.26	6	350	---	931
220	61	6	65;117;158;178	45	4/70	20	.13	5	265	---	932
100	22	6	57;84	18	11/66	20	.24	5	260	---	933
160	21	6	50;150	88	8/71	6	---	10	450	---	934
216	63	6	104;212	42	8/71	80	.56	4	220	---	935
104	---	6	---	36	8/71	---	---	5	265	---	936
310	22	6	---	152	7/71	15	15	---	---	---	937
118	64	6	68;89;113	45	7/69	50	.91	6	300	---	938
300	60	6	75;87;180;275	55	5/69	8	.03	3	140	---	939
103	32	6	---	27	8/71	10	---	3	185	---	940
101	---	6	---	44	8/71	80	---	4	220	---	941
143	---	6	---	48	8/71	22	---	4	220	---	942

TABLE 14.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Be-943	4028-7611	Robert Schrack	John H. Mays	1968	H	510	H	Oh1/---
944	4029-7608	Paul Burkholder	Clarence F. Wink	1970	H	517	V	Oh1/---
945	4028-7609	Harold Kremser, Jr.	Kermit S. Snyder	1971	H	496	S	Oh1/---
946	4027-7611	Thomas Schaeffer	James Bucci	1959	H	530	S	Oh1/---
947	4024-7606	William Huyett	Richard H. Stanley	1969	H	355	V	Oh4/ls
948	4023-7607	Jon Fisher	Kohl Bros., Inc.	1964	H	380	S	Oh4/ls
949	4024-7604	J. R. Orth	Richard H. Stanley	1971	H	320	S	Oh4/ls
950	4023-7606	Harold Moyer, Sr.	do.	1968	H	376	S	Oh4/sh
951	4029-7606	Meredith Murray	James Bucci	1959	H	460	S	Oh1/sh
952	4028-7606	Mark Balthaser	Kohl Bros., Inc.	1970	H	460	S	Oh1/ss
953	4027-7605	Lee Katz	do.	1963	H	445	V	Oh2/sh
954	4026-7606	Delmar Brant	Kermit S. Snyder	1968	H	385	V	Oh3/---
955	4027-7605	Richard Hoffman	Kohl Bros., Inc.	1964	H	480	S	Oh3/sh
956	4026-7605	Lester Mengel	do.	1968	H	480	H	Oh3/---
957	4027-7603	W. S. Gregery	do.	1970	H	522	H	Oh2/ls
958	4025-7505	David Nagel	Richard H. Stanley	1968	H	420	S	Oh3/sh
959	4025-7604	Edmund Bright	Kohl Bros., Inc.	1963	H	370	V	Oh2/ls
960	4025-7604	Aaron Loump	do.	1965	S	370	V	Oh2/ls
961	4025-7603	Kenneth Lutz	Richard H. Stanley	1969	H	503	H	Oh7/---
962	4023-7603	Fox Lake Corp.	---	1927	P	300	S	Oh4/ls
963	4023-7603	Robert Ebbert	Kohl Bros., Inc.	1957	U	300	S	Oh4/ls
964	4023-7605	Edward Altemus	do.	1968	H	360	V	Oh4/ls
965	4022-7604	Russell Kissling	do.	1963	H	550	S	Oh6/---
966	4022-7606	Otto Schnee	Edward M. Arnold, Sr.	1969	H	442	H	Oh2/ls
967	4024-7601	Robert Nye	Kerr Bros.	1966	H	440	S	Oh4/ls
968	4023-7600	Andrew Linette	Petersheim Bros.	1970	H	410	H	Oh6/sh
969	4025-7601	Russell Delong	James Bucci	1967	H	410	S	Oh4/ls
970	4025-7600	Charles Strause	Kohl Bros., Inc.	1964	H	450	V	Oh7/sh
971	4025-7600	Olin Evans, Jr.	Richard H. Stanley	1970	H	580	H	Oh7/sh
972	4026-7559	C. R. Miller	Elmer C. Lenhart	1968	H	338	V	Oh2/sh
973	4029-7600	Daniel Henn	Kermit S. Snyder	1969	H	370	S	Oh2/sh
974	4029-7600	C. H. Smith	Elmer C. Lenhart	1967	H	350	S	Oh2/sh
975	4028-7602	James Herr	James Bucci	1966	H	350	V	Oh2/ls
976	4027-7600	James Stamm	do.	1966	H	405	V	Oh2/ls
977	4027-7602	Larry Zimmerman	Elmer C. Lenhart	1970	H	500	S	Oh3/---
978	4027-7600	Larry Englert	Richard H. Stanley	1969	H	345	V	Oh2/ls
979	4025-7558	John Emore	Robert O. Grant	1971	H	335	V	Oh6/sh
980	4026-7559	Vincent Pantuso	Petersheim Bros.	1970	H	476	H	Oh4/sh
981	4025-7557	Harold Manbeck	---	---	S	280	V	Oe/ls
982	4025-7558	Osmund Gensley	---	1959	H	380	S	Oo/dol
983	4023-7559	Robert Bamford	James Bucci	1966	H	440	S	Oh6/ls
984	4025-7600	Otto Kosa	Kohl Bros., Inc.	1970	H	550	H	Oh7/sh
985	4027-7559	Joan Althouse	Richard H. Stanley	1969	H	470	S	Oh2/ls
986	4027-7558	Harold Nunemaker	Kermit S. Snyder	1970	H	312	S	Oh2/sh
987	4029-7558	Roger Berger	Kohl Bros., Inc.	1970	H	460	H	Oh1/---
988	4028-7559	William Beissel	do.	1971	H	342	S	Oh2/ls
989	4028-7558	Arra Reichard	Kermit S. Snyder	1968	H	303	V	Oh2/sh
990	4029-7557	Wolfe Dye & Bleach Works, Inc.	Kohl Bros., Inc.	1971	N	385	V	Oh2A/sh
991	4029-7557	Glen-Gery Corp.	---	1927	N	335	S	Oh1/---
992	4028-7556	Ronald Newhard	Elmer C. Lenhart	1969	H	458	S	Oh4/---
993	4027-7557	Earl Putt	Clarence F. Wink	1963	I	415	V	Oh4/---
994	4028-7556	Sebastian Lombardo	Morris Bailey	1961	I	502	H	Oh4/---
995	4027-7556	City of Reading	---	---	H	330	V	Oj/arls
996	4028-7557	Birch Hill Foundries, Inc.	Kermit S. Snyder	1959	N	305	H	Oh2/---
997	4028-7553	Ben-Mar Mushroom Farms, Inc.	Morris Bailey	1961	I	---	H	Omb/sh
998	4028-7555	Howard Phillips	do.	1965	H	437	S	Oh4/---
999	4029-7554	Harold Strause	Clarence F. Wink	1964	H	390	S	Oh2A/---
1000	4029-7555	Edgar Nuss	do.	1971	H	457	V	Oh2A/---
1001	4027-7553	Cinelli Bros.	Kermit S. Snyder	1960	I	---	S	Oe/ls
1002	4027-7552	William Burgert	do.	1964	H	375	V	€amc/dol
1003	4028-7551	Lee Heffner, Inc.	Kohl Bros., Inc.	1963	S	377	S	€amc/dol
1004	4027-7550	Eli Zimmerman	do.	1964	S	382	V	€am/dol
1005	4027-7548	C. R. Border	do.	1958	U	435	S	€at/dol
1006	4027-7548	Myers Canning Co.	do.	1965	N	460	S	€lv/dol
1007	4027-7547	Eli Weaver	Petersheim Bros.	1970	H	430	V	€lv/dol
1008	4029-7551	Wilbert Strunk	Elmer C. Lenhart	1970	H	440	S	Oh1/sh
1009	4026-7552	John Angstadt	do.	1969	H	382	S	Or/dol
1010	4026-7548	Fleetwood Bor.	---	---	P	581	V	€ha/meta
1011	4026-7548	do.	---	---	P	744	S	gn/meta
1012	4033-7559	General Battery Corp.	Kohl Bros., Inc.	1964	U	365	V	Oh1/ss
1013	4033-7559	Calvary Bible Ch.	Kermit S. Snyder	1969	H	430	S	Oh1/sh

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
105	33	6	---	36	---	30	---	3	165	---	8e-943
75	40	6	---	---	---	20	---	4	205	---	944
166	---	6	---	50	8/71	24	---	3	160	---	945
105	20	6	---	60	1959	---	---	3	200	---	946
70	34	6	34	25	4/69	15	.60	7	370	---	947
72	42	6	52;70	20	1/64	20	.50	3	180	---	948
55	18	6	12;52	17	8/71	12	.67	7	350	---	949
80	18	6	32;55	29	10/68	30	5.0	4	240	---	950
80	43	6	60;75	14	12/70	15	---	5	225	6.7	951
120	64	6	76;114	61	12/70	15	.25	2	100	---	952
132	40	6	70;94;126	15	9/71	15	.15	4	225	---	953
118	40	6	60;85;100	5	5/68	45	.69	4	210	---	954
98	21	6	63;87	25	3/64	20	.27	5	265	---	955
200	47	6	76;112;174	43	9/71	25	.17	5	280	7.4	956
160	45	6	85;148	43	4/70	20	.19	2	90	---	957
95	---	6	73;80;90	55	11/68	15	---	8	380	---	958
75	45	6	50;55;60	25	9/63	75	2.1	7	365	---	959
300	21	6	178	45	7/65	15	.06	4	285	---	960
132	18	6	---	44	9/71	10	---	3	200	---	961
90	---	6	---	47	9/71	---	---	8	440	7.0	962
85	26	6	84	20	12/57	20	20	---	---	---	963
180	35	6	89;161	17	9/71	20	.12	5	285	---	964
198	45	6	68;172	65	8/63	8	.06	---	---	---	965
100	49	6	62;71	42	10/69	---	---	4	200	---	966
190	8	6	---	50	7/66	20	.40	4	225	---	967
123	53	6	75;80;112	38	12/71	40	---	6	380	6.4	968
123	58	6	70;110;115	45	2/67	50	---	6	310	---	969
385	24	6	120	16	9/71	4	.01	2	300	---	970
194	49	6	85;190	74	9/71	18	.33	---	---	---	971
75	29	6	20;46;75	10	9/71	16	2.0	4	210	---	972
120	30	6	87;93;114	17	9/71	30	.55	4	240	---	973
75	26	6	31;63;75	14	9/71	17	1.1	5	300	---	974
120	24	6	55;85;110	20	8/66	6	---	---	---	---	975
100	22	6	50	2	1969	6	---	3	160	---	976
132	71	6	43;70;104;132	45	3/70	16	.53	---	---	---	977
42	31	6	8;35	F	8/69	30	2.5	13	630	---	978
114	37	6	45;77;110	29	11/71	30	6.0	6	400	---	979
160	37	6	50;110;145	67	9/71	6	.05	2	105	---	980
50	---	6	---	21	9/71	---	---	14	720	---	981
310	---	6	100	46	9/71	2	---	7	---	---	982
160	23	6	---	15	9/71	8	---	2	285	---	983
195	54	6	112;150;185	65	12/70	15	.12	---	---	---	984
120	63	6	75;95;118	45	9/71	30	30	8	370	---	985
122	40	6	74;92;107	22	9/71	30	.60	3	205	---	986
140	41	6	90;132	41	9/71	50	.57	5	290	---	987
140	21	6	84;135	32	4/71	20	.18	5	265	---	988
90	30	6	38;55;79	20	8/68	42	2.8	---	---	---	989
445	63	6	180	90	5/71	140	2.7	---	---	---	990
96	---	6	---	10	3/48	60	.94	11	---	7.6	991
155	82	6	68;118;155	52	7/49	13	.65	3	185	---	992
240	---	8	---	---	---	65	---	6	350	---	993
135	---	6	---	39	11/70	---	---	1	110	---	994
71	---	6	---	17	9/71	---	---	14	760	7.0	995
513	25	8	---	55	5/59	125	3.4	8	495	---	996
200	---	6	---	---	---	---	---	6	390	---	997
125	22	6	---	65	10/71	60	---	1	100	---	998
85	45	6	---	9	10/71	---	---	5	320	---	999
70	---	6	---	35	4/71	9	---	5	305	---	1000
450	12	6	---	---	---	18	---	10	500	---	1001
85	---	6	---	26	10/71	---	---	9	550	---	1002
96	56	6	73;80	27	10/71	60	1.1	11	610	---	1003
101	42	6	98	16	10/71	35	3.5	9	480	7.4	1004
225	139	6	200;220	30	10/71	20	.67	---	---	---	1005
175	13	8	115;135;155	38	10/71	210	4.7	6	320	---	1006
94	60	6	75;88	22	10/71	100	---	8	420	---	1007
114	42	6	83;88;114	55	9/70	12	2.4	4	245	---	1008
155	105	6	60;115;155	53	10/71	10	10	8	420	---	1009
150	100	8	---	45	---	90	6.0	2	---	6.8	1010
170	135	8	---	45	---	45	2.2	2	---	6.7	1011
260	43	6	62;147;252	18	9/64	100	.98	---	---	---	1012
145	40	6	65;90;127	36	10/71	30	.75	4	220	---	1013

TABLE 14.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Be-1014	4032-7559	Mills Mobile Home Court	Morris Bailey	1968	H	520	S	Oh1/ss
1015	4029-7552	William Keller	Kermit S. Snyder	1949	P	440	S	Oo/dol
1016	4028-7551	do.	Jos. M. Mayer	1970	C	442	H	Ꞓamc/dol
1017	4027-7553	Robert Miller	---	1955	H	361	S	Or/dol
1018	4030-7550	Charles Adam	Elmer C. Lenhart	1965	H	463	S	Oh1/---
1019	4030-7548	Charles Brensinger	Clarence F. Wink	1965	H	482	S	Oj/arls
1020	4030-7548	Mabel Bieber	Kermit S. Snyder	1955	H	440	S	Oo/dol
1021	4031-7547	Clarence Althouse, Jr.	Elmer C. Lenhart	1964	U	485	S	Omr/---
1022	4031-7546	Kutztown Meat & Ice Co.	Harry H. Herman	---	N	405	V	Oo/dol
1023	4031-7545	F. E. Meyer	Elmer C. Lenhart	1967	H	510	S	Oj/arls
1024	4030-7547	Melvin Adam	Kermit S. Snyder	1963	H	462	S	Oo/dol
1025	4030-7546	Clarence Hoch	---	---	H	505	H	Oe/ls
1026	4032-7545	Charles Haaf	---	---	H	520	V	Oj/arls
1027	4029-7549	Berkleigh Country Club	Kohl Bros., Inc.	1926	I	355	V	Or/dol
1028	4029-7549	do.	Max Fisher	1958	I	380	V	Oe/ls
1029	4029-7545	Josef Winkler	Kermit S. Snyder	1954	S	433	V	Ꞓam/dol
1030	4029-7546	John Hoch	C. S. Garber & Sons, Inc.	1965	H	425	V	Ꞓamc/dol
1031	4028-7546	East Penn Mfg. Co., Inc.	do.	1947	N	580	S	Ꞓlv/dol
1032	4028-7546	do.	do.	1962	N	560	S	Ꞓlv/dol
1033	4028-7546	do.	do.	1969	N	580	S	Ꞓlv/dol
1034	4028-7547	Harvey Weaver	Clarence F. Wink	1965	C	458	V	Ꞓat/dol
1035	4027-7546	James Allen	Elam K. Troxel	1971	H	540	S	Ꞓlv/dol
1036	4029-7547	Leroy Biehl	C. S. Garber & Sons, Inc.	1963	S	402	V	Ꞓamc/dol
1037	4029-7548	Paul Schucker	Clarence F. Wink	1967	H	405	S	Or/dol
1038	4028-7548	H. L. Althouse	Elmer C. Lenhart	1962	H	420	V	Ꞓam/dol
1039	4028-7549	Lorraine Angstadt	---	1925	H	418	H	Ꞓam/dol
1040	4026-7550	Esther Berg	Kermit S. Snyder	---	H	525	S	Ꞓlv/dol
1041	4027-7548	W. A. Rauenzahn	do.	1967	H	614	S	Ꞓlv/dol
1042	4027-7549	Daniel Strause	Jos. M. Mayer	1967	C	402	V	Ꞓam/dol
1043	4028-7550	Julius Billitz	James Bucci	1967	U	400	H	Ꞓamc/dol
1044	4027-7551	B. H. Burgert	Kermit S. Snyder	1967	S	365	V	Ꞓamc/dol
1045	4030-7550	Moselem Golf Club	Kohl Bros., Inc.	1963	H	340	V	Oo/dol
1046	4029-7544	Raymond Weil	Elam K. Troxel	1967	H	420	V	Ꞓat/dol
1047	4028-7543	Herbert Heffner	Elmer C. Lenhart	1966	H	598	S	Ꞓlv/dol
1048	4029-7543	John Melot	Kohl Bros., Inc.	1964	S	480	S	Ꞓha/meta
1049	4030-7541	Caloric Corp.	Harry H. Herman	---	N	469	V	Ꞓat/dol
1050	4030-7541	do.	do.	---	N	469	V	Ꞓat/dol
1051	4030-7541	do.	do.	---	U	470	V	Ꞓat/dol
1052	4030-7542	General Seating Co.	---	---	U	470	S	Ꞓat/dol
1053	4030-7539	St. Paul's Lutheran Ch.	R. H. Odenheiner Co.	1966	H	495	S	Ꞓlv/dol
1054	4029-7538	Arthur Greiss	Homer C. Herman	1965	H	495	S	gn/meta
1055	4029-7538	Franklin Meck	---	1955	H	505	V	Ꞓha/meta
1056	4031-7543	Lester Dries	Kermit S. Snyder	1970	H	468	S	Ꞓamc/dol
1057	4032-7544	Quarry Farm Park	Clarence F. Wink	1969	P	541	H	Oj/arls
1058	4032-7544	Berkleigh Excavating Co., Inc.	---	1971	H	540	H	Oj/arls
1059	4030-7544	E. C. Burkholder	---	---	S	450	S	Os/ls
1060	4031-7544	Harry Weaver	---	---	S	418	V	Oe/ls
1061	4031-7544	Vanbrunt Trucking Co.	---	1968	C	440	V	Oo/dol
1062	4033-7544	John Wessner	---	---	S	520	S	Oh1/---
1063	4033-7543	Ben Brubaker	Morris Bailey	1953	S	587	S	Oj/arls
1064	4032-7543	Mrs. A. M. Steckel	Elmer C. Lenhart	1963	S	496	V	Oe/ls
1065	4031-7540	David Bittenbender	C. S. Garber & Sons, Inc.	1971	H	456	V	Ꞓamc/do
1066	4026-7550	Donald Stetzler	Elmer C. Lenhart	1967	H	430	S	Ꞓlv/dol
1067	4026-7557	Ontelaunee Orchards	Kermit S. Snyder	1963	N	300	S	Oo/dol
1068	4027-7556	do.	do.	1965	S	363	V	Oo/dol
1069	4027-7557	do.	James Bucci	1965	U	---	S	Oh4/---
1070	4027-7558	Miles Kirkhoff	Kermit S. Snyder	1955	P	315	S	Oh4/---
1071	4025-7557	Harold Manbeck	---	---	H	327	S	Or/dol
1072	4024-7556	John Manegold	James Bucci	1968	H	320	H	Ꞓam/dol
1073	4028-7552	Pleasant Hills Golf Course	---	---	I	358	V	Oe/ls
1074	4025-7554	M. A. J. DeSantis, Inc.	Kohl Bros., Inc.	1971	I	360	S	Ꞓlv/dol
1075	4026-7553	Temple Aluminum Foundry	Kermit S. Snyder	1957	N	374	S	Ꞓat/dol
1076	4022-7600	Richard Reber	Richard H. Stanley	1970	H	267	V	Oh6/sh
1077	4022-7601	Otto Bachman	Kohl Bros., Inc.	1958	H	260	S	Oh6/sh
1078	4022-7602	Glen McCauley	Robert O. Grant	1967	H	290	V	Oh5/sh
1079	4033-7559	Fairmount Foundry, Inc.	Clarence F. Wink	1966	N	360	V	Oh1/---
1080	4033-7559	do.	do.	1971	N	362	V	Oh1/---
1081	4031-7559	W. T. Strausser	Kermit S. Snyder	1968	H	339	V	Oh1/ss
1082	4031-7557	John Glass	do.	1969	H	405	S	Oh4/sh

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
100	21	6	90	55	1/68	---	---	4	180	---	8e-1014
340	---	6	---	99	10/71	---	---	12	580	---	1015
220	10	6	---	95	10/71	---	---	12	650	7.1	1016
93	---	6	---	37	10/71	---	---	10	500	---	1017
78	23	6	---	20	10/71	18	---	5	295	---	1018
300	40	6	---	28	10/71	10	---	10	510	---	1019
112	30	6	---	25	10/31	30	---	12	670	---	1020
144	75	6	---	24	10/71	22	---	---	---	---	1021
850	---	12	---	7	10/71	---	---	14	840	---	1022
440	23	6	17;63;299;333	35	7/67	1	.01	21	1000	---	1023
297	---	6	---	41	10/71	12	---	11	660	---	1024
350	75	6	---	96	10/71	6	---	11	745	---	1025
---	---	6	---	16	10/71	---	---	12	650	---	1026
55	---	8	---	7	10/71	250	---	10	600	---	1027
93	---	10	---	25	10/71	450	---	---	---	---	1028
170	---	6	---	23	10/71	20	---	6	380	7.3	1029
160	61	6	---	30	10/71	30	.27	9	470	---	1030
282	197	6	---	140	10/71	---	---	---	---	---	1031
348	232	6	---	139	10/71	42	4.2	6	295	7.7	1032
541	198	12	---	154	6/69	45	.63	6	310	---	1033
210	40	6	---	69	10/71	10	---	11	600	---	1034
200	180	6	---	95	10/71	---	---	5	265	---	1035
192	58	6	---	21	10/71	100	.65	10	500	---	1036
210	52	6	115;198	55	10/71	12	---	11	600	---	1037
110	96	6	---	55	10/71	8	---	15	820	---	1038
119	---	6	---	48	10/71	---	---	13	680	---	1039
180	---	6	---	139	10/71	---	---	5	245	---	1040
294	232	6	---	176	10/71	18	---	4	240	---	1041
156	150	6	---	17	10/71	---	---	10	490	---	1042
125	75	6	80	44	10/71	---	---	10	510	---	1043
182	---	6	---	14	10/71	---	---	10	560	---	1044
180	41	6	130;168	12	7/63	150	.89	---	---	---	1045
95	90	6	---	15	10/71	---	---	6	360	---	1046
136	110	6	60;104;136	36	10/71	12	.60	11	705	7.0	1047
135	120	6	41;108;128	56	10/71	50	.77	3	300	6.3	1048
400	---	---	---	---	---	---	---	12	900	---	1049
400	---	6	---	---	---	---	---	---	---	---	1050
500	---	6	---	---	---	---	---	---	---	---	1051
111	---	10	---	58	10/71	---	---	---	---	---	1052
135	89	6	120;133	81	10/71	15	---	5	300	---	1053
108	---	6	---	11	10/71	---	---	2	160	6.5	1054
99	---	6	---	48	10/71	---	---	1	70	5.9	1055
102	16	6	60;80	68	11/71	20	4.0	6	660	---	1056
325	28	6	---	29	11/71	30	---	15	950	---	1057
210	---	6	---	39	11/71	---	---	15	800	7.1	1058
58	---	48	---	46	11/71	---	---	14	860	---	1059
79	---	6	---	13	11/71	---	---	9	550	7.2	1060
92	---	6	---	31	11/71	---	---	16	750	---	1061
80	---	6	---	F	11/71	---	---	7	420	---	1062
119	10	6	---	20	11/71	---	---	14	750	---	1063
122	---	6	---	12	11/71	8	---	12	660	---	1064
100	57	6	---	44	11/71	150	1.4	5	260	---	1065
160	103	6	141;156	44	11/71	17	1.1	5	370	---	1066
206	64	6	---	38	11/71	30	---	15	790	---	1067
108	28	6	---	16	11/71	31	---	10	570	7.2	1068
160	---	6	---	---	---	18	---	---	---	---	1069
90	---	6	---	26	11/71	---	---	7	410	---	1070
48	---	48	---	42	11/71	---	---	14	760	---	1071
101	---	6	---	77	11/71	---	---	8	440	---	1072
85	---	6	---	27	11/71	---	---	10	545	---	1073
400	72	6	255;284;298;340	69	11/71	50	.21	8	450	---	1074
206	200	6	---	87	11/71	40	40	4	220	7.6	1075
130	61	6	45;85;120	30	11/71	20	6.7	5	335	---	1076
186	38	6	175	52	6/58	12	4.0	---	---	---	1077
87	40	6	48;82	18	12/67	20	.91	---	---	---	1078
200	43	6	---	35	---	50	---	7	550	---	1079
220	45	6	---	13	11/71	60	---	---	---	---	1080
48	33	6	28;45	23	7/68	30	1.1	6	350	---	1081
125	31	6	80;97;109	25	11/71	30	2.0	2	135	---	1082

TABLE 14.

Well location		Owner	Driller	Date completed	Use	Alti-tude of land surface (feet)	Topo-graphic setting	Aquifer/ litholog
Number	Lat-Long							
Be-1083	4031-7556	R. K. Freymoyer	Elmer C. Lenhart	1966	H	480	H	Oh4/---
1084	4032-7556	Harry Sproesser	Kermit S. Snyder	1969	H	560	H	Oh4/sh
1085	4031-7554	R. P. Grim	do.	1970	H	455	S	Oh4/sh
1086	4031-7553	John Niggel	do.	1962	H	442	H	Oh4/---
1087	4030-7550	Gerald Devore	Kohl Bros., Inc.	1963	H	670	H	Oh4/ls
1088	4031-7551	Earl Heffner	Elmer C. Lenhart	1970	H	480	H	Oh4/---
1089	4030-7553	Gun N' Fun, Inc.	James Bucci	1966	C	362	V	Oh4/ls
1090	4027-7557	Ontelaunee Orchards	---	---	H	343	V	Oo/dol
1091	4020-7606	Rodney Borkert	Kohl Bros., Inc.	1971	H	385	H	Omy/ls
1092	4020-7605	Robert Wenrich	Morris Bailey	1968	H	340	V	Omb/sh
1093	4021-7607	Berle Eiceman	John H. Mays	1964	H	485	H	Omb/sh
1094	4021-7606	Paul Gelsinger	---	1910	H	442	S	Omb/sh
1095	4023-7553	William Woomer	Elmer C. Lenhart	1968	H	515	V	€lc/dol
1096	4028-7553	Allentown Portland Cement Co.	---	---	U	338	V	Oj/arls
1097	4023-7606	Ronald Moyer	Richard H. Stanley	1970	H	395	S	Oh4/sh
1098	4029-7538	Edgar Rhoads	Ernest Conrad	1955	H	450	S	€lv/dol
1099	4033-7542	Warren Kohler	Clarence F. Wink	1971	H	519	V	Oe/ls
1100	4030-7648	Ignatz Schwab	Kermit S. Snyder	1960	H	430	S	Oo/dol
1101	4026-7555	Robert Krunanocker	Kohl Bros., Inc.	1971	H	345	S	Or/dol
1102	4022-7601	U. S. Army Corps of Engineers	---	1966	U	332	S	Oh5/---
1103	4022-7601	do.	---	1966	U	280	S	Oh5/---
1104	4022-7602	do.	---	1966	U	298	S	Oh5/---
1105	4028-7603	Ralph Sievert	James Bucci	1970	H	380	V	Oh1/sh
1106	4029-7602	Al Bobbin	Richard H. Stanley	1971	H	380	V	Oh1/---
1107	4028-7602	Kinzy Reed	R. H. Odenheiner Co.	1970	H	440	H	Oh2/sh
1108	4028-7605	Daniel Wenrich	Morris Bailey	1971	H	525	H	Oh1/---
1109	4027-7606	Ronald Kershner	James Bucci	1971	H	400	S	Oh1/---
1110	4029-7603	John Schrack	Samuel N. Snyder	---	H	470	S	Oh1/sh
1111	4029-7601	Stanley Rhoads	Richard H. Stanley	1971	H	357	V	Oh2/sh
1112	4028-7600	Dennis Miller	Kohl Bros., Inc.	1971	H	500	H	Oh2/ls
1113	4028-7601	George Kline	do.	1969	H	515	S	Oh3/---
1114	4029-7601	Dennis Haag	James Bucci	1971	H	422	S	Oh2/---
1115	4029-7604	J. S. Guzanowski	C. S. Garber & Sons, Inc.	1971	H	485	S	Oh1/---
1116	4026-7602	Joseph Greusel	Kermit S. Snyder	1953	H	400	V	Oh2/---
1117	4026-7600	John Rothermel	do.	1954	H	380	S	Oh2/---
1118	4026-7602	M. K. Zimmerman	James Bucci	1969	H	520	S	Oh3/---
1119	4026-7603	Mark Bixler	Kermit S. Snyder	1954	H	478	S	Oh7/---
1120	4027-7602	Ronald Haas	Elmer C. Lenhart	1969	H	460	S	Oh3/ss
1121	4034-7557	Daniel Reidenhour	do.	1952	H	545	S	Oh1/---
1122	4024-7554	George Adam	Clarence F. Wink	1971	H	645	H	Oh1/---
1123	4034-7556	Donald Anderson	Kermit S. Snyder	1969	H	610	H	Oh1/ss
1124	4034-7555	Warren Zettlemoyer	Clarence F. Wink	1965	H	635	H	Oh1/---
1125	4033-7552	Harold Herring	do.	1971	H	338	V	Oh1/---
1126	4033-7553	Fredrick Shearer	Kermit S. Snyder	1963	H	450	S	Oh1/---
1127	4033-7554	Milan Boyer	Clarence F. Wink	1950	H	545	S	Oh1/---
1128	4033-7555	Nevin Heckman	Kermit S. Snyder	1969	H	---	H	Oh1/ss
1129	4033-7556	Walter Adams	Clarence F. Wink	1970	H	580	S	Oh1/---
1130	4033-7557	Richard Trabosh	do.	1971	H	575	H	Oh1/---
1131	4031-7558	Vaux Masonic Temple Assn.	do.	1967	C	480	S	Oh1/---
1132	4031-7558	Windsor Mutual Insurance Co.	do.	1962	C	475	S	Oh1/ss
1133	4032-7557	S. P. Christman	Kermit S. Snyder	1965	H	545	S	Oh1/---
1134	4032-7556	Catharine Readinger	do.	1969	H	625	H	Oh1/ss
1135	4032-7555	Harold Seidel	James Bucci	1968	H	530	S	Oh1/---
1136	4032-7553	Robert Kieffer	Kermit S. Snyder	1966	H	395	V	Oh2A/---
1137	4031-7553	Daniel Hill	Clarence F. Wink	1971	H	540	S	Oh4/---
1138	4031-7555	Richard Davis	Kermit S. Snyder	1969	H	405	V	Oh4/sh
1139	4030-7555	George Weiler	do.	1965	H	530	H	Oh2A/---
1140	4030-7554	John Merkel	Clarence F. Wink	1956	H	420	V	Oh4/---
1141	4029-7552	Raymond Snyder	Elmer C. Lenhart	1970	H	450	S	Oh1/sh
1142	4035-7553	Donald Brooks	Clarence F. Wink	1970	H	465	S	Oh1/sh
1143	4035-7554	C. O. Geist	R. H. Odenheiner Co.	1968	H	600	S	Oh1/---
1144	4037-7555	Arthur Clauser	Elmer C. Lenhart	1971	H	450	V	Ou/sh
1145	4037-7553	Jacob Kunkel	Jerry Wessner	1900	H	462	V	Ou/sh
1146	4036-7552	Osville Henninger	Elmer C. Lenhart	1970	H	390	V	Oh1/ss
1147	4037-7557	Clive Lentz	Clarence F. Wink	1968	H	645	S	Osh/ss
1148	4038-7556	Marlin Miller	Kermit S. Snyder	1971	H	500	S	Ou/sh
1149	4038-7553	Ronald Weaver	Clarence F. Wink	1965	H	480	S	Ou/---
1150	4039-7553	Delano Schucker	do.	1965	H	480	V	Ou/sh
1151	4038-7552	Henry Gass	C. S. Garber & Sons, Inc.	1972	H	440	V	Ou/sh

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
121	---	6	50;85;120	28	11/71	15	.60	2	150	---	Be-1083
164	40	6	150;160	50	9/69	30	.75	6	330	---	1084
78	37	6	43;56;70	11	11/71	15	.26	2	165	---	1085
212	23	6	---	43	11/71	30	---	2	155	---	1086
248	102	6	245	100	11/71	8	.05	4	265	---	1087
150	45	6	52;77;139	45	8/70	6	.08	3	170	6.0	1088
100	46	6	70;85;90	13	11/71	50	---	2	130	---	1089
14	---	48	---	10	11/71	---	---	---	---	---	1090
220	21	6	180;204	31	12/71	50	.59	16	760	7.2	1091
80	7	6	70	F	12/71	---	---	4	295	7.7	1092
150	---	6	---	---	---	20	---	6	370	7.8	1093
45	---	6	---	---	---	10	---	16	880	7.2	1094
165	120	6	63;137;165	115	3/68	10	1.0	6	320	7.6	1095
80	---	6	---	F	12/71	30	---	15	810	6.9	1096
65	31	6	45;55	22	4/70	30	30	3	225	6.4	1097
72	42	6	---	15	3/72	---	---	6	365	7.6	1098
180	178	6	---	86	3/72	20	---	---	---	---	1099
110	---	6	---	13	3/72	---	---	---	---	---	1100
390	42	6	268;381	46	3/72	10	.03	9	470	---	1101
100	---	3	---	26	---	---	---	---	---	---	1102
100	---	3	---	38	12/66	---	---	---	---	---	1103
50	---	3	---	21	11/66	---	---	---	---	---	1104
95	21	6	---	2	5/72	8	.29	4	210	---	1105
77	39	6	15;75	12	5/72	20	.57	4	280	---	1106
152	42	6	75;147	75	6/70	8	---	3	135	---	1107
107	---	6	---	36	5/72	4	.16	6	265	---	1108
100	---	6	---	15	5/72	18	.50	4	230	---	1109
134	---	6	---	---	---	---	---	5	260	---	1110
85	17	6	34;78	15	5/72	20	1.5	4	285	---	1111
120	84	6	97;111	54	11/71	20	.30	4	220	---	1112
158	40	6	78;118;154	38	5/72	15	.14	2	105	---	1113
125	---	6	---	8	5/72	---	---	4	220	---	1114
120	42	6	---	41	5/72	30	---	4	210	---	1115
45	36	6	---	13	5/72	30	---	8	380	---	1116
85	20	6	---	5	---	10	---	6	300	---	1117
102	20	6	40	40	7/69	8	---	3	185	---	1118
90	30	6	---	18	1954	---	---	2	120	---	1119
125	30	6	50;79;125	37	10/69	12	.52	3	180	---	1120
85	---	6	---	10	---	---	---	4	220	---	1121
270	60	6	170	60	1971	5	---	4	170	---	1122
157	20	6	100;120;135	55	6/72	6	.07	4	200	---	1123
150	40	6	---	39	6/72	---	---	2	98	---	1124
120	41	6	---	2	6/72	15	---	4	215	---	1125
108	---	6	---	19	6/72	---	---	4	210	---	1126
108	---	6	---	---	---	9	---	4	180	---	1127
275	34	6	180;225;270	78	6/72	6	.03	5	270	---	1128
238	70	6	---	48	6/72	15	---	5	225	---	1129
175	---	6	35;160	---	---	14	---	3	160	---	1130
250	60	6	---	---	---	30	---	---	---	---	1131
170	88	6	---	42	6/62	8	.80	4	200	---	1132
115	20	6	---	---	---	40	---	2	140	---	1133
135	36	6	71;94;126	52	6/72	30	.60	4	240	---	1134
90	20	6	---	34	6/72	---	---	2	85	---	1135
102	22	6	---	---	---	30	---	5	275	---	1136
340	32	6	---	160	---	15	---	2	150	---	1137
118	20	6	20;50;118	5	6/69	48	1.6	3	180	---	1138
105	60	6	---	34	6/72	5	.29	5	240	---	1139
65	---	6	---	F	6/72	---	---	5	285	---	1140
128	35	6	77;95;128	46	6/72	16	1.3	2	105	---	1141
150	40	6	---	24	11/70	16	---	6	295	---	1142
200	90	6	---	---	---	---	---	4	195	---	1143
84	28	6	56;84	7	3/71	8	.23	7	340	---	1144
60	---	6	---	20	---	5	---	5	295	---	1145
92	24	6	33;78;92	12	6/70	8	.13	5	250	---	1146
80	30	6	---	---	---	7	---	6	220	---	1147
89	38	6	---	29	8/72	22	---	6	245	---	1148
110	27	6	---	---	---	---	---	5	170	---	1149
85	---	6	---	---	---	---	---	6	190	---	1150
350	---	6	---	10	8/72	---	---	6	260	---	1151

TABLE 14.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ litholog
Number	Lat-Long							
Be-1152	4037-7549	Elwood Wessner	Elwood C. Wessner	1937	H	665	V	Ohl/---
1153	4037-7551	Nevin Deysher	Elmer C. Lenhart	1966	H	480	H	Ou/sh
1154	4038-7551	Willis Henry	Elwood C. Wessner	1961	H	430	V	Osh/ss
1155	4038-7551	do.	Clarence F. Wink	1969	H	480	5	Osh/ss
1156	4039-7552	Oolores Owens	R. H. Odenheiner Co.	1971	H	465	V	Omr/sh
1157	4038-7554	Arlin Lutz	Elmer C. Lenhart	1970	H	480	V	Ou/sh
1158	4037-7555	George Berk	Himmelberger	1956	H	460	V	Osh/ss
1159	4037-7549	New Jerusalem Ch.	Clarence F. Wink	1971	H	560	H	Ou/sh
1160	4034-7546	Kenneth Kunkel	Homer C. Herman	1972	H	830	H	Ohl/---
1161	4035-7545	Imperial Mobile Estates, Inc.	Petersheim Bros.	1971	P	590	V	Ohl/---
1162	4034-7545	do.	do.	1971	U	780	S	Ohl/---
1163	4034-7544	Mark Bleiler	Elam K. Troxel	1969	H	550	V	Ohl/---
1164	4033-7544	Timothy White	Clarence F. Wink	1972	H	530	5	Ohl/---
1165	4034-7545	Stanley German	Elmer C. Lenhart	1968	H	640	S	Ohl/ss
1166	4033-7543	Terry 5topp	C. 5. Garber & Sons, Inc.	1967	H	665	S	Ohl/---
1167	4033-7546	Curtis Oaub	Elmer C. Lenhart	1971	H	575	V	Ohl/sh
1168	4032-7545	Russell Deturk	do.	1972	H	490	5	Omr/sh
1169	4032-7547	Kutztown Rod and Gun Club	Edward M. Arnold, 5r.	1971	R	420	V	Ohl/sh
1170	4032-7546	Marlowe Leibensberger	Elmer C. Lenhart	1970	H	435	V	Ohl/ss
1171	4032-7548	William Zellers	do.	1971	H	400	V	Ohl/---
1172	4032-7548	Gerald Feinour	do.	1971	H	500	5	Ohl/ss
1173	4033-7548	Charles Gilmore	Kermit 5. 5nyder	1969	H	680	H	Ohl/sh
1174	4033-7549	Allen Smith	Elmer C. Lenhart	1970	H	720	S	Ohl/ss
1175	4035-7551	Wayne Stump	do.	1971	H	600	H	Ohl/ss
1176	4035-7550	Nevin Oonat	Clarence F. Wink	1957	H	590	S	Ohl/---
1177	4034-7548	Roy Kistler	Elmer C. Lenhart	1970	H	710	5	Ohl/ss
1178	4035-7549	Arthur Collani	R. H. Odenheiner Co.	1970	H	580	5	Ohl/sh
1179	4036-7549	Gilbert Borgman	Kermit 5. Snyder	1969	H	640	5	Ohl/---
1180	4036-7547	W. H. VanOuren	R. H. Odenheiner Co.	1971	H	560	V	Ohl/sh
1181	4036-7548	Lennia Kutz	Clarence F. Wink	1968	S	710	H	Ohl/---
1182	4036-7550	Willard Oietrich	do.	1971	H	580	S	Ohl/---
1183	4035-7551	Oallas Henninger	R. H. Odenheiner Co.	1970	H	690	5	Ohl/sh
1184	4036-7550	8. D. OiBonaventura	Elmer C. Lenhart	1971	H	720	H	Ohl/---
1185	4035-7552	Guy Long	Clarence F. Wink	1960	5	575	S	Ohl/---
1186	4035-7547	Lowell Hawley	do.	1971	H	822	H	Ohl/---
1187	4035-7546	Paul Peters	R. H. Odenheiner Co.	1970	H	785	H	Ohl/---
1188	4035-7548	Ellis Kerschner	Clarence F. Wink	1968	H	762	H	Ohl/---
1189	4033-7551	Lester Miller	Elmer C. Lenhart	1969	H	475	S	Ohl/ls
1190	4034-7551	Robert 5chwoyer	R. H. Odenheiner Co.	1970	H	662	H	Ohl/sh
1191	4031-7550	Crystal Cave Co., Inc.	Kohl Bros., Inc.	1960	C	420	V	Oh4/ls
1192	4033-7559	Jack Berry	Elmer C. Lenhart	1972	H	346	V	Ohl/ss
1195	4031-7552	Joseph Marco	do.	1970	H	385	V	Oh4/sh
1196	4030-7551	P. O. Perugini	James Bucci	1967	H	440	V	Oh4/---
1197	4031-7548	Robert Tyson	Elam K. Troxel	1972	H	598	H	Ohl/---
1198	4032-7550	Garrett Smith	Morris Bailey	1972	H	440	S	Ohl/sh
1199	4033-7550	Alan Merkel	Clarence F. Wink	1965	H	465	V	Ohl/---
1200	4034-7549	Howard Heinly	Kermit 5. 5nyder	1963	H	600	S	Ohl/---
1201	4030-7549	Werner Amman	Clarence F. Wink	1972	H	600	S	Ohl/---
1202	4030-7540	K R G Chem. Service, Inc.	R. H. Odenheiner Co.	1972	N	425	V	€at/dol
1203	4020-7558	Goodman Co.	Kohl 8ros., Inc.	---	U	340	H	€amc/dol
1204	4019-7551	Glen Alsace Water Co.	do.	1973	U	280	V	€lc/dol
1205	4021-7610	P. K. Huber	do.	1959	H	486	S	€sc/dol
1206	4022-7613	J. R. Mayer	Petersheim Bros.	1960	S	380	V	Oe/ls
1207	4028-7544	Flint Hill Water Co.	---	1966	P	527	S	€ha/meta
1208	4024-7555	Muhlenberg Twp. Auth.	Layne-New York Co., Inc.	1973	P	380	H	€lv/dol

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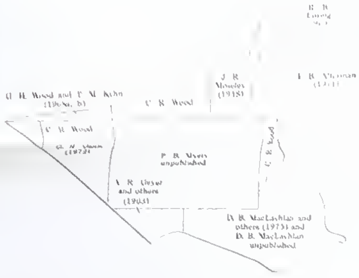
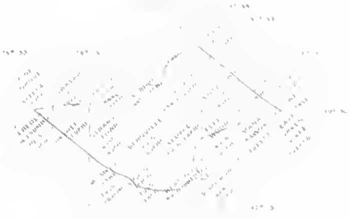
Total depth below land urface feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
110	25	6	---	18	---	6	1.5	7	240	---	Be-1152
150	24	6	54;106;150	40	6/66	12	.21	10	335	---	1153
71	19	6	---	15	8/72	---	---	6	210	---	1154
150	---	6	---	50	3/70	18	---	6	200	---	1155
152	23	6	77;127;146	20	8/71	6	---	6	260	---	1156
98	22	6	15;67;98	8	7/70	10	.31	7	240	---	1157
150	---	6	---	---	---	---	---	4	275	---	1158
145	81	6	---	45	---	15	---	7	245	---	1159
122	30	6	---	50	8/72	12	.58	10	425	6.6	1160
300	37	6	50;65;115; 200;250	6	9/71	78	1.0	3	---	6.9	1161
600	---	6	---	41	8/72	3	.01	5	215	---	1162
72	---	6	---	10	1969	20	---	4	135	---	1163
---	---	6	---	28	8/72	---	---	3	115	---	1164
100	36	6	50;85;100	53	9/72	10	10	3	115	---	1165
170	30	6	---	30	7/72	8	---	5	180	---	1166
50	44	6	15;38;49	F	9/71	15	.44	5	195	---	1167
301	26	6	64;268;300	35	9/72	3	.01	6	240	---	1168
295	40	6	56;221;238; 255;286	12	10/71	46	1.2	2	245	---	1169
76	36	6	30;50;76	20	9/72	10	1.2	6	220	---	1170
100	20	6	---	5	3/71	11	.35	5	180	---	1171
122	29	6	72;99;122	25	5/71	14	.48	---	---	---	1172
150	40	6	80;105;135	73	9/72	30	.75	5	185	---	1173
110	32	6	63;89;110	31	9/72	15	.60	4	170	---	1174
117	24	6	51;68;117	40	1/71	7	.16	7	220	---	1175
140	45	6	---	40	12/57	10	.12	4	145	---	1176
97	39	6	32;63;97	45	2/70	16	16	3	105	---	1177
100	20	6	57;91;98	15	8/70	10	---	5	160	---	1178
101	33	6	63;98	23	9/72	13	.24	5	165	---	1179
125	23	6	99;121	25	4/71	25	---	5	160	---	1180
90	---	6	---	20	---	24	---	4	150	---	1181
110	60	6	---	5	---	20	---	4	155	---	1182
145	27	6	114;141	40	6/70	25	---	4	160	---	1183
193	55	6	92;156;193	78	7/71	10	.14	3	110	---	1184
140	---	6	---	6	---	30	---	4	150	---	1185
150	---	6	---	67	9/72	12	---	3	105	---	1186
125	32	6	---	30	7/70	25	---	3	140	---	1187
240	---	6	---	62	9/72	5	.57	3	130	---	1188
69	44	6	43;69	34	9/72	18	.82	15	460	---	1189
150	43	6	78;148	15	5/30	40	---	4	140	---	1190
93	28	6	32;89	18	11/60	25	1.1	8	270	---	1191
97	78	5	15;66;85;97	8	6/72	22	1.3	---	---	---	1192
138	34	6	70;93;138	42	9/72	12	.25	4	145	---	1195
68	---	6	---	---	9/72	6	.69	7	260	---	1196
165	---	6	---	35	9/72	---	---	7	190	---	1197
122	47	6	65;80;122	47	9/72	10	---	5	160	---	1198
82	40	6	---	14	9/72	35	---	4	170	---	1199
90	---	6	---	---	---	---	---	3	110	---	1200
150	40	6	---	51	9/72	15	---	9	365	---	1201
112	49	8	---	23	5/72	325	---	11	400	---	1202
65	---	6	---	38	9/72	10	.70	22	700	---	1203
220	20	6	35;56;78; 215	10	2/73	40	.19	---	---	---	1204
138	130	6	50;135	25	7/73	12	---	---	---	---	1205
171	46	6	---	27	11/70	30	.24	---	---	---	1206
149	40	6	---	---	---	50	---	---	---	---	1207
400	51	12	---	96	8/73	715	48	---	---	---	1208

TOPOGRAPHIC AND GEOLOGIC SURVEY
Arthur A. Socolow

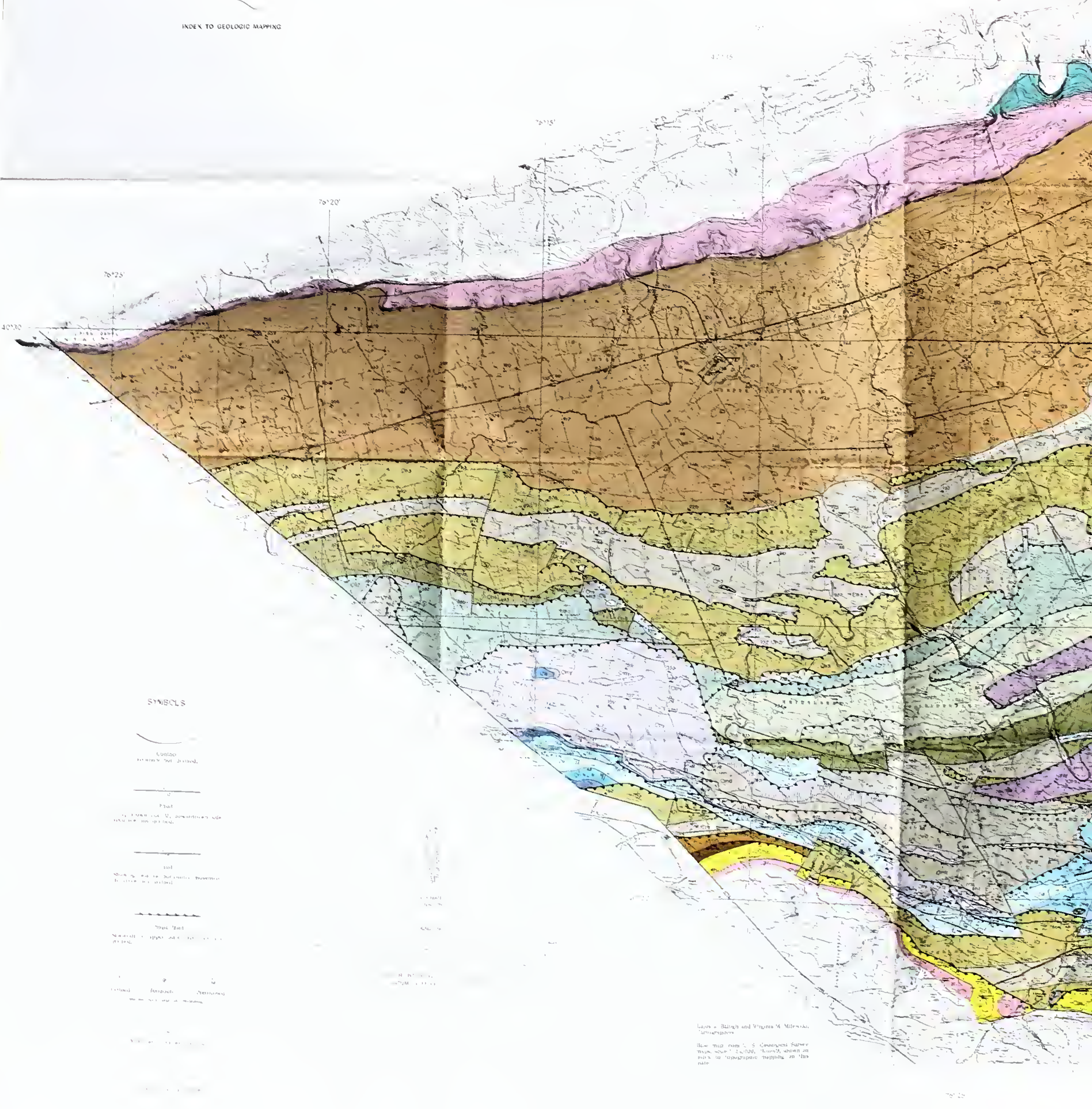

G. H. Wood and P. M. Kehn (1961a, b)
C. R. Wood
J. R. Moseley (1918)
C. R. Wood
P. B. Myers unpublished
A. R. Geyer and others (1963)
C. R. Wood
D. B. MacLachlan and others (1975) and D. B. MacLachlan unpublished

INDEX TO GEOLOGIC MAPPING



INDEX TO TOPOGRAPHIC MAPPING

LOCATION OF AREA



SYMBOLS

Contact

Fault

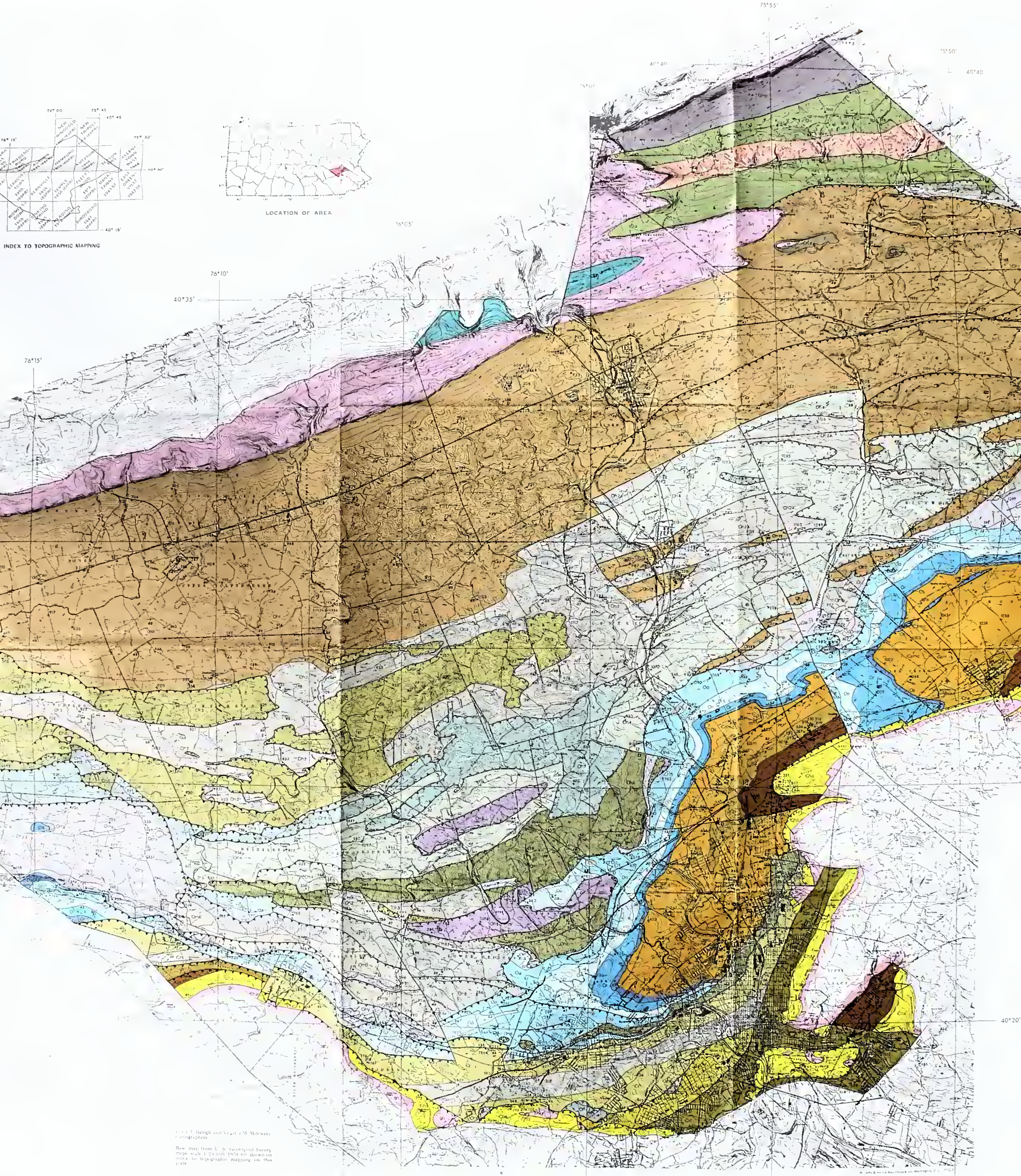
Thrust fault

Base map from U. S. Geological Survey topographic maps, scale 1:24,000, shown on index to topographic mapping on this plate

GEOLOGIC MAP O
SHOWING

GEOLO

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES



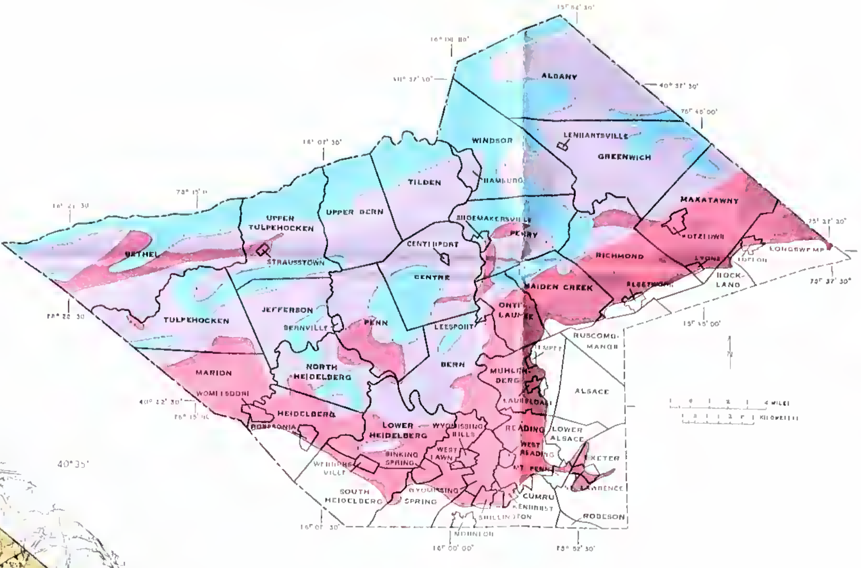
[illegible] J. Balogh and [illegible] M. [illegible], Cartographers

Base map from U. S. Geological Survey maps, scale 1:24,000, [illegible] as shown on index to topographic mapping on this plate

GEOLOGIC MAP OF NORTHERN BERKS COUNTY, PENNSYLVANIA, SHOWING LOCATIONS OF WELLS AND SPRINGS

GEOLOGY COMPILED AND EDITED BY CHARLES R. WOOD

1978



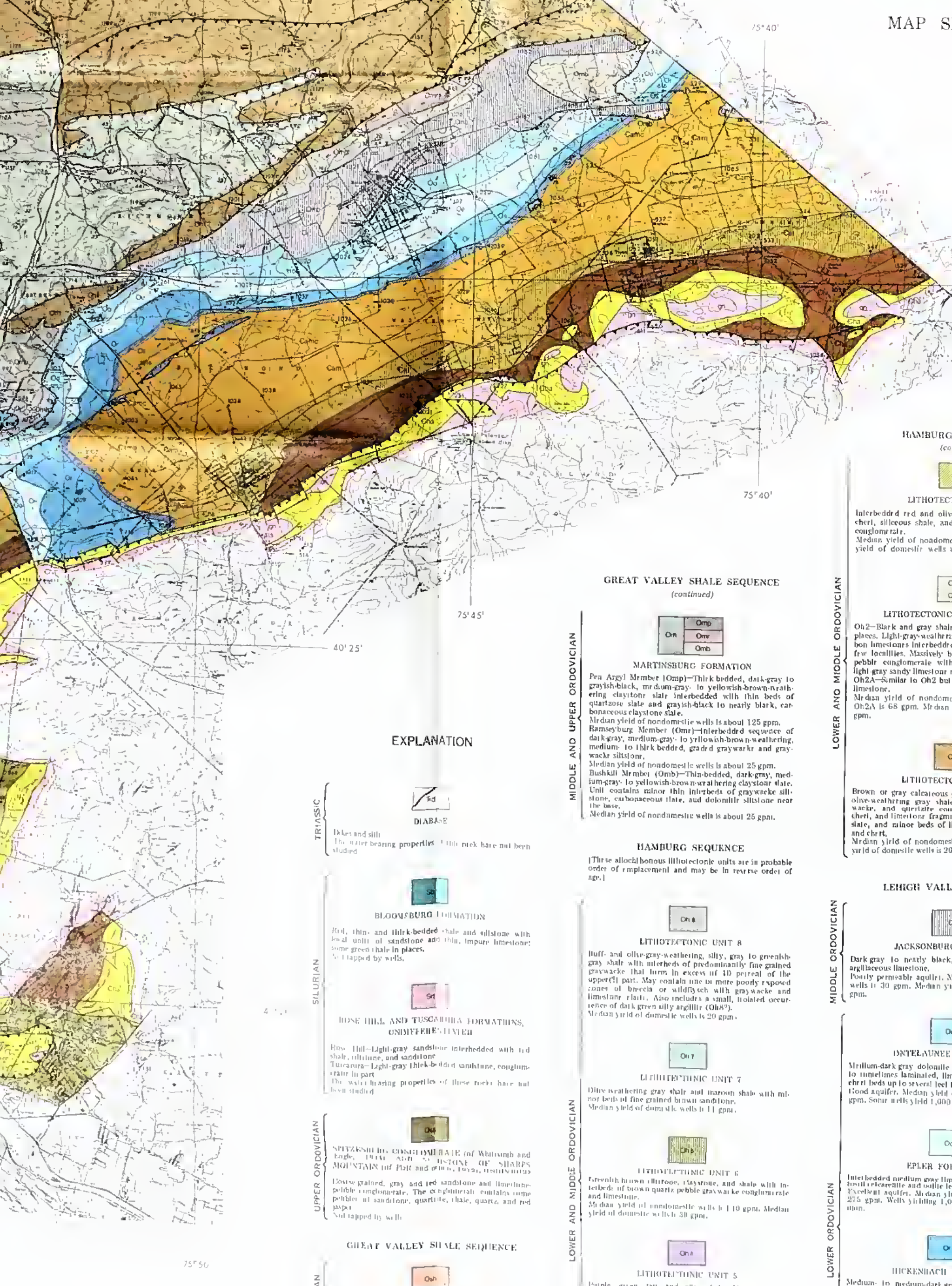
MAP SHOWING HARDNESS OF GROUNDWATER

EXPLANATION

HARDNESS OF WATER, IN MILLIGRAMS PER LITER

🟦	60 or less, soft
▨	*61-120, moderately hard*
🟥	121-180, hard
🟥	More than 180, very hard

Colors are generalized; a few wells yield water that is higher or lower in hardness than the range for the color shown on the map.
17.1 milligrams per liter = 1 grain per U. S. gallon



PENNSYLVANIA,
SPRINGS
OOD

EXPLANATION

TRIASSIC

Trd

DIABASE

Dikes and sills.
The water-bearing properties of this rock have not been studied.

SILURIAN

Sb

BLOOMSBURG FORMATION

Red, thin- and thick-bedded shale and siltstone with local units of sandstone and thin, impure limestone; some green shale in places.
Not tapped by wells.

Srt

ROSE HILL AND TUSCARORA FORMATIONS, UNDIFFERENTIATED

Rose Hill—Light-gray sandstone interbedded with red shale, siltstone, and sandstone.
Tuscarora—Light-gray thick-bedded sandstone, conglomerate in part.
The water-bearing properties of these rocks have not been studied.

UPPER ORDOVICIAN

Osl

SPITZENBERG CONGLOMERATE (of Whitcomb and Engle, 1934) AND [illegible]STONE OF SHARPS MOUNTAIN (of Platt and others, [illegible]), UNDIVIDED

Coarse-grained, gray and red sandstone and limestone-pebble conglomerate. The conglomerate contains some pebbles of sandstone, quartzite, shale, quartz, and red jasper.
Not tapped by wells.

GREAT VALLEY SHALE SEQUENCE

MIDDLE AND UPPER ORDOVICIAN

Osh

SHOCHARY SANDSTONE of Willard and Cleaves, 1939

Medium- to fine-grained, well-sorted, even-bedded, calcareous sandstone. The relationship of this unit to the members of the Martinsburg Formation is uncertain.
Too few data are available to evaluate the water-bearing properties of this unit.

Ou

UNNAMED

Chiefly gray shale. Underlies the Shochary Sandstone.
Wells generally yield adequate supplies of water for domestic use.

GREAT VALLEY SHALE SEQUENCE
(continued)

MIDDLE AND UPPER ORDOVICIAN

Om — Omp, Omr, Omb

MARTINSBURG FORMATION

Pen Argyl Member (Omp)—Thick-bedded, dark-gray to grayish-black, medium-gray- to yellowish-brown-weathering claystone slate interbedded with thin beds of quartzose slate and grayish-black to nearly black, carbonaceous claystone slate.
Median yield of nondomestic wells is about 125 gpm.
Ramseyburg Member (Omr)—Interbedded sequence of dark-gray, medium-gray- to yellowish-brown-weathering, medium- to thick-bedded, graded graywacke and graywacke siltstone.
Median yield of nondomestic wells is about 25 gpm.
Bushkill Member (Omb)—Thin-bedded, dark-gray, medium-gray- to yellowish-brown-weathering claystone slate. Unit contains minor thin interbeds of graywacke siltstone, carbonaceous slate, and dolomitic siltstone near the base.
Median yield of nondomestic wells is about 25 gpm.

HAMBURG SEQUENCE

[These allochthonous lithotectonic units are in probable order of emplacement and may be in reverse order of age.]

MIDDLE ORDOVICIAN

Oh8

LITHOTECTONIC UNIT 8

Buff- and olive-gray-weathering, silty, gray to greenish-gray shale with interbeds of predominantly fine-grained graywacke that form in excess of 40 percent of the upper(?) part. May contain one or more poorly exposed zones of breccia or wildflysch with graywacke and limestone clasts. Also includes a small, isolated occurrence of dark green silty argillite (Oh8?).
Median yield of domestic wells is 20 gpm.

Oh7

LITHOTECTONIC UNIT 7

Olive-weathering gray shale and maroon shale with minor beds of fine-grained brown sandstone.
Median yield of domestic wells is 11 gpm.

LOWER AND MIDDLE ORDOVICIAN

Oh6

LITHOTECTONIC UNIT 6

Greenish-brown siltstone, claystone, and shale with interbeds of brown quartz-pebble graywacke conglomerate and limestone.
Median yield of nondomestic wells is 110 gpm. Median yield of domestic wells is 30 gpm.

LOWER ORDOVICIAN

Oh5

LITHOTECTONIC UNIT 5

Purple, green, tan, and olive shale. Minor beds of limestone.
Too few data are available to evaluate the water-bearing properties of this unit.

Oh4

LITHOTECTONIC UNIT 4

Interbedded greenish-gray noncalcareous siltstone in thick to massive beds, a few beds of quartzite overlain by (or perhaps interbedded with) thin- to medium-bedded, sandy limestone, black and orange-weathering laminated shale, a few beds of conglomerate, and limestones of various types (edgewise conglomerate, calcilutite, and calcarenite). Many caves have developed in this unit.
Median yield of nondomestic wells is 62 gpm. Median yield of domestic wells is 20 gpm.

HAMBURG SEQUENCE
(continued)

LOWER AND MIDDLE ORDOVICIAN

Oh3

LITHOTECTONIC UNIT 3

Interbedded red and olive siltstone and shale, bedded chert, siliceous shale, and limestone-pebble graywacke conglomerate.
Median yield of nondomestic wells is 30 gpm. Median yield of domestic wells is 20 gpm.

Oh2, Oh2A

LITHOTECTONIC UNITS 2 AND 2A

Oh2—Black and gray shale and silty shale, dolomitic in places. Light-gray-weathering, medium- to dark-gray ribbon limestones interbedded with the slate and shale at a few localities. Massively bedded calcarenite, limestone-pebble conglomerate with a black slate matrix, and light gray sandy limestone conglomerate are also present.
Oh2A—Similar to Oh2 but with only minor amounts of limestone.
Median yield of nondomestic wells in units Oh2 and Oh2A is 68 gpm. Median yield of domestic wells is 20 gpm.

Oh1

LITHOTECTONIC UNIT 1

Brown or gray calcareous graywacke interbedded with olive-weathering gray shale and slate, quartzite, graywacke, and quartzite conglomerate containing slate, chert, and limestone fragments, red and green shale and slate, and minor beds of limestone and siliceous slate and chert.
Median yield of nondomestic wells is 75 gpm. Median yield of domestic wells is 20 gpm.

LEHIGH VALLEY SEQUENCE

MIDDLE ORDOVICIAN

Oj

JACKSONBURG FORMATION

Dark gray to nearly black, fine-grained, thin-bedded, argillaceous limestone.
Poorly permeable aquifer. Median yield of nondomestic wells is 30 gpm. Median yield of domestic wells is 10 gpm.

LOWER ORDOVICIAN — BEEKMANTOWN GROUP

Oo

ONTELAUNEE FORMATION

Medium-dark gray dolomite with medium-gray, mottled to sometimes laminated, limestone interbeds; dark-gray chert beds up to several feet thick near base.
Good aquifer. Median yield of nondomestic wells is 105 gpm. Some wells yield 1,000 gpm or more.

Oe

EPLER FORMATION

Interbedded medium-gray limestone and dolomite. Some fossil calcarenite and oolite lenses.
Excellent aquifer. Median yield of nondomestic wells is 275 gpm. Wells yielding 1,000 gpm or more are common.

Or

RICKENBACH FORMATION

Medium- to medium-dark gray, very cherty dolomite. Light gray, sometimes porous chert in lower part, predominantly blocky, dark chert in upper part.
Median yield of domestic wells is 18 gpm. May be a good aquifer, but no data are available from nondomestic wells that could be used to properly evaluate the unit.

Os

STONEHENGE FORMATION

Medium-gray limestone, with abundant shaly to siliceous laminae, calcarenite lenses, and intraformational conglomerate; dolomite interbeds near base. Formation is about 250 feet thick at Schuylkill River and may thin eastward as it becomes more dolomitic and tends to converge in character with the Rickenbach Formation.
Probably a good aquifer, but too thin to be important.

LEHIGH VALLEY SEQUENCE
(continued)

UPPER CAMBRIAN

Ɛamc, Ɛam, Ɛal

ALLENTOWN FORMATION

Predominantly gray dolomite to silty dolomite; usually thick bedded with subordinate interbedded limestone; algal laminite structures common, some oolite, and sharpstone conglomerate; tends to be more calcareous and shaly toward base, which may be older than otherwise equivalent Conococheague Group. Divided into Maiden Creek Member (Ɛamc), which contains abundant thin-bedded to nodular dark chert; Muhlenberg Member (Ɛam), which includes calcareous sandstone and some shale; Tuckerton Member (Ɛal), which has particularly prominent cyclic algal and oolite beds near top and becomes more shaly downward.
Median yield of nondomestic wells is 210 gpm in Maiden Creek Member, 60 gpm in Muhlenberg Member, and 68 gpm in Tuckerton Member. Many wells in the Maiden Creek and Muhlenberg Members are capable of yielding 1,000 gpm or more.

MIDDLE CAMBRIAN — LOWER CAMBRIAN

Ɛl

LEITHSVILLE FORMATION

Predominantly gray dolomite with considerable chert in lower part; shaly in upper part. Poorly exposed.
Median yield of nondomestic wells is 110 gpm.

LOWER CAMBRIAN

Ɛha

HARDYSTON FORMATION

Quartzose and feldspathic sandstones and quartzites; conglomerate near base.
Median yield of nondomestic wells is 31 gpm.

PRECAMBRIAN

gn

GRANITE GNEISS AND GRANITE

The water-bearing properties of these rocks have not been studied.

LEBANON VALLEY SEQUENCE

MIDDLE ORDOVICIAN

Ohy

HERSHEY FORMATION

Dark gray argillaceous limestone. Dolomite conglomerate in lower part.
Poorly permeable aquifer. Median yield of domestic wells is 15 gpm.

Omy

MYERSTOWN FORMATION

Gray crystalline thin-bedded limestone; graphitic at base.
Median yield of domestic wells is 20 gpm.

Oa

ANNVILLE FORMATION

Light-gray, finely crystalline, thick-bedded, high-calcium limestone.
Permeability unknown. Not an important aquifer because of small areal extent and thinness.

LOWER ORDOVICIAN — BEEKMANTOWN GROUP

Oo

ONTELAUNEE FORMATION

Medium-dark gray, finely crystalline dolomite, pure at top, mottled beds of limestone compose about 50 percent of medial portion. Dark-gray beds of chert near base.
Good aquifer. Median yield of nondomestic wells is 105 gpm. Some wells will yield 1,000 gpm or more.

Oe

EPLER FORMATION

Interbedded medium-gray limestone and dolomite, with calcarenite lenses; dark nodular chert common in the dolomite.
Excellent aquifer. Median yield of nondomestic wells is 200 gpm. Wells yielding 1,000 gpm or more are common.

LEBANON VALLEY SEQUENCE
(continued)

LOWER ORDOVICIAN — BEEKMANTOWN GROUP

Or

RICKENBACH FORMATION

Gray cherty dolomite with subordinate limestone interbeds, darker and more coarsely crystalline toward top.
Median yield of domestic wells is 28 gpm. May be a good aquifer, but no data are available from nondomestic wells that could be used to properly evaluate the unit.

Os

STONEHENGE FORMATION

Medium-gray limestone, cherty to upper part; numerous nonshaly beds and laminations, intraformational conglomerate, and calcarenite lenses. Formation is about 400 feet thick in Berks County. Thickens to west.
Probably a good aquifer, but too limited in areal extent to be important.

UPPER CAMBRIAN — CONOCOCHEAGUE GROUP

Ɛr

RICHLAND FORMATION

Predominantly gray dolomite, thick-bedded, with subordinate interbeds of limestone in shallow-water to intertidal cycles. Limestone somewhat more abundant in middle of formation. Dolomitic and sandy toward base.
Excellent aquifer. Median yield of nondomestic wells is 200 gpm. Many wells will yield 1,000 gpm or more.

Ɛm

MILLBACH FORMATION

Interbedded limestone and dolomite, predominantly light-gray to occasionally pinkish-gray, especially toward the west. Algal structures and intraformational conglomerates widely distributed.
Good aquifer. Median yield of nondomestic wells is 190 gpm.

Ɛsc

SNITZ CREEK FORMATION

Medium-gray dolomite, coarsely crystalline, oolitic, and cherty; beds of sandstone near top.
Probably a fair aquifer, but too limited in areal extent to be important.

MIDDLE CAMBRIAN

Ɛbs

BUFFALO SPRINGS FORMATION

Interbedded limestone and dolomite, predominantly light-gray to occasionally pinkish-gray, especially toward the west; rather shaly, sandy in part; algal structures locally abundant, especially near top.
Median yield of nondomestic wells is 60 gpm. About 25 percent of the wells drilled in this unit have yields of 200 gpm or more.

LOWER AND MIDDLE CAMBRIAN

Ɛlc

MIDDLE AND LOWER CAMBRIAN CARBONATE ROCKS, UNDIFFERENTIATED, OF NORTHERN CONESTOGA VALLEY AFFINITIES

Predominantly dolomite, in part light-gray, massively bedded (Ledger? Formation), also medium-bedded, sometimes shaly (Zooks Corner? Formation). Also, isolated calcareous and shaly areas may in part be Buffalo Springs Formation.
Median yield of nondomestic wells is 75 gpm. East of Reading this aquifer does not yield adequate water for public supply and industrial use.

Ɛah

ANTIETAM(?) AND HARPERS(?) FORMATIONS, UNDIVIDED

Dark gray-green silty meta-argillite; graded, thin to medium beds, variably disrupted, irregularly fractured with poor cleavage.
Not tapped by wells.

Ɛha

HARDYSTON FORMATION

Quartzose and feldspathic sandstones and quartzites; conglomerate near the base.
Median yield of nondomestic wells is 31 gpm.

PRECAMBRIAN

gn

GRANITE GNEISS AND GRANITE

The water-bearing properties of these rocks have not been studied.

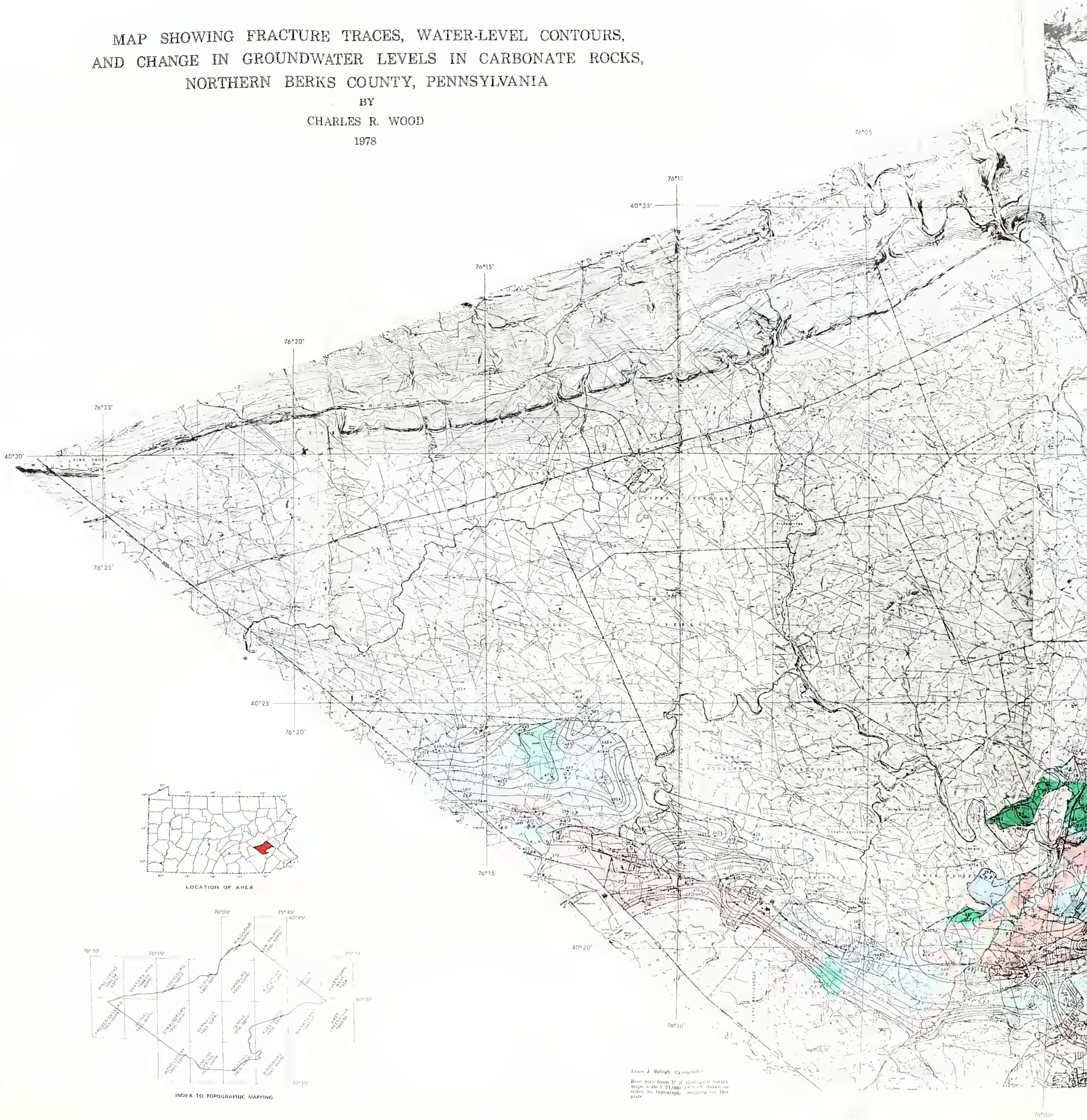
TOPOGRAPHIC AND GEOLOGIC SURVEY
Arthur A. Socolow, *State Geologist*

MAP SHOWING FRACTURE TRACES, WATER-LEVEL CONTOURS, AND CHANGE IN GROUNDWATER LEVELS IN CARBONATE ROCKS, NORTHERN BERKS COUNTY, PENNSYLVANIA

BY

CHARLES R. WOOD

1978



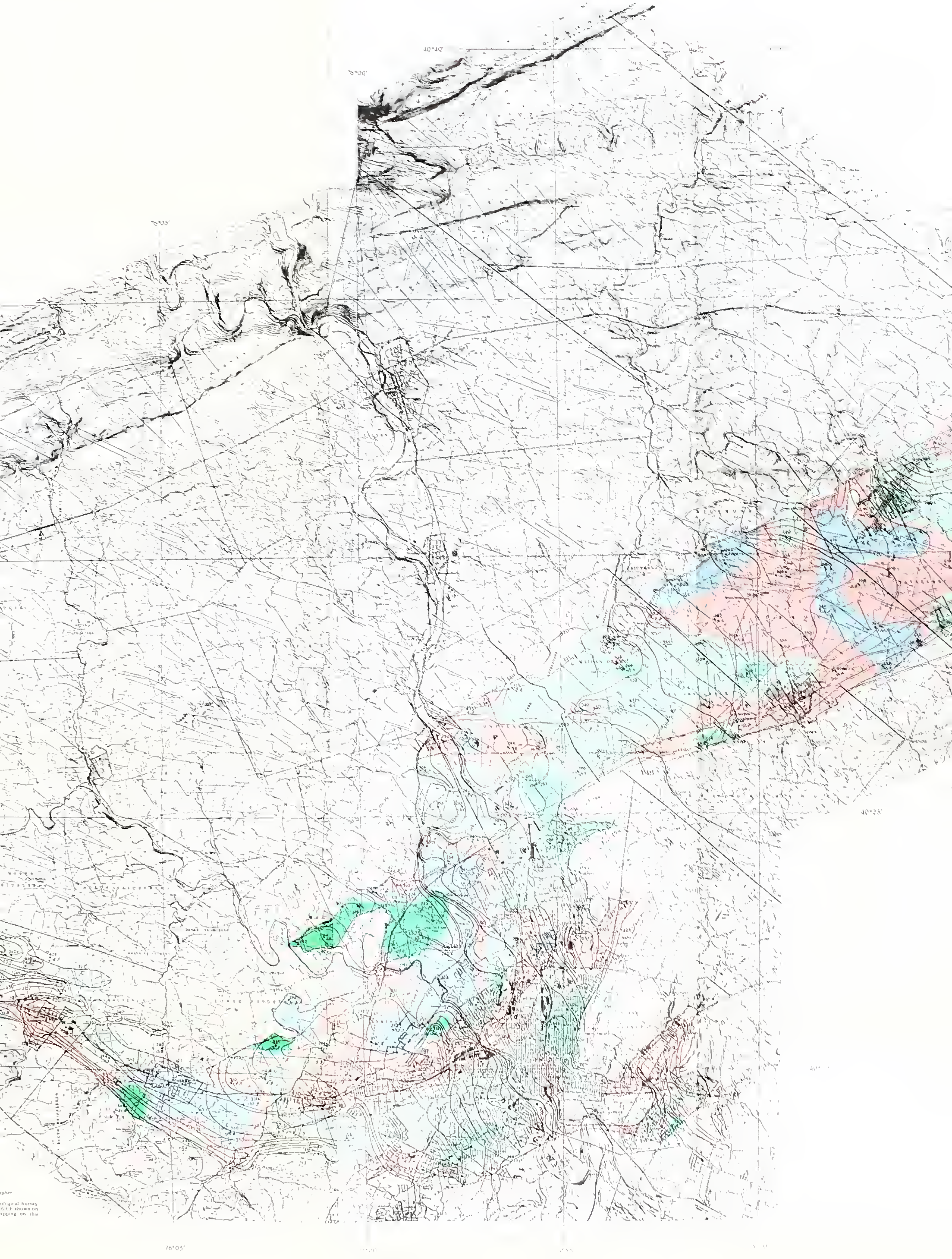
LOCATION OF AREA

INDEX TO TOPOGRAPHIC MAPPING

Lajos J. Balogh, Cartographer

Base map from U. S. Geological Survey maps scale 1:24,000 [illegible] shown on index to topographic mapping on this plate

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES



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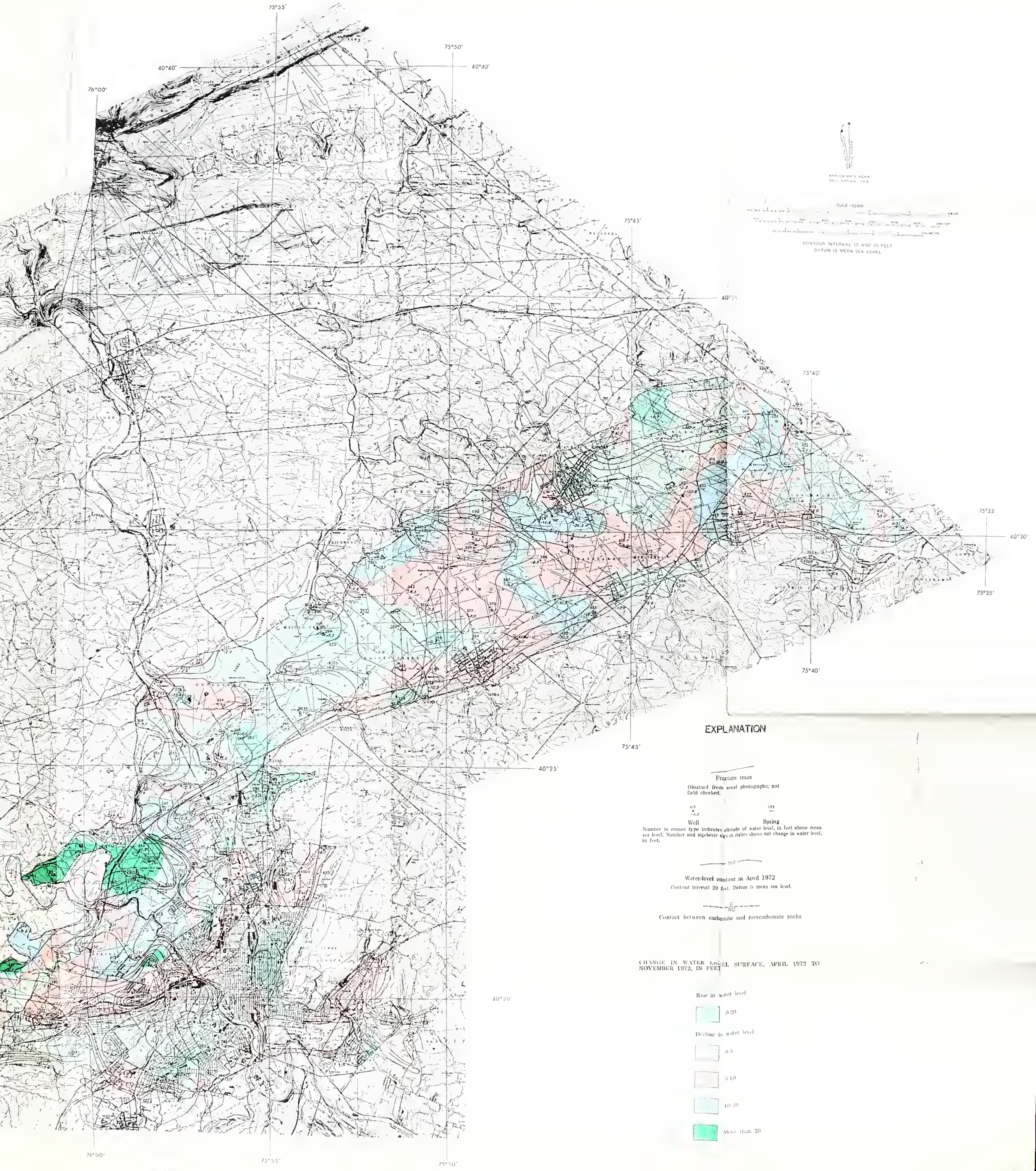
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES



EXPLANATION

Fracture trace

Obtained from aerial photographs; not field checked.

Well

Spring

Number in roman type indicates altitude of water level, in feet above mean sea level. Number and algebraic sign in italics shows net change in water level, in feet.

Water-level contour in April 1972

Contour interval 20 feet. Datum is mean sea level.

Contact between carbonate and noncarbonate rocks

CHANGE IN WATER LEVEL SURFACE, APRIL 1972 TO NOVEMBER 1972, IN FEET

Rise in water level

🟩	0-20

Decline in water level

☐	0-5
🟥	5-10
🟦	10-20
🟩	More than 20